FINAL
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CALENDAR YEAR 2018 LONG-TERM MONITORING/ LONG-TERM OPERATIONS REPORT

ENVIRONMENTAL REMEDIATION SERVICES

Contract W91278-12-D-0007 Task Order CK01

HOLSTON ARMY AMMUNITION PLANT

KINGSPORT, TENNESSEE
U.S. Army Corps of Engineers
Mobile District

Calendar Year 2018 Long-Term Monitoring/Long-Term Operations Report for Holston Army Ammunition Plant, Kingsport, Tennessee, EPA ID No. TN521-002-0421 March 2019

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CONTRACT W91278-12-D-0007
TASK ORDER CK01

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HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TENNESSEE

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ACRONYMS

µg/L ..... micrograms per liter
% ..... percent
AMSL ..... above mean sea level
ACM ..... asbestos-containing material
AOC ..... area of concern
AOC-GW ..... Area of Concern – Site-Wide Groundwater
ASTM ..... American Society for Testing and Materials
Bay West ..... Bay West LLC
BTEX ..... benzene, toluene, ethylbenzene, and xylenes
CAO ..... Corrective Action Order
cm ..... centimeter
COC ..... contaminant of concern
cy ..... cubic yard/s
DCQCR ..... Daily Chemical Quality Control Contractor Report
DNT ..... dinitrotoluene
DNX hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine
DO ..... dissolved oxygen
DQSR ..... Data Quality Summary Report
EPA ..... U.S. Environmental Protection Agency
ft ..... foot/feet
FWO ..... field work order
gal ..... gallon
GWPS ..... groundwater protection standard
HMX octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
hr ..... hour
HSAAP ..... Holston Army Ammunition Plant
IDW ..... investigation-derived waste
in. ..... inch
IWTP ..... industrial wastewater treatment plant
LCS ..... laboratory control sample
LHA ..... lifetime health advisory
LOQ ..... limit of quantitation
LTM ..... long-term monitoring
LTO ..... long-term operations
LUC ..... land use control
LUCIP ..... Land Use Control Implementation Plan
MCL ..... maximum contaminant level
mL/min ..... milliliter per minute
MNA ..... monitored natural attenuation
MNX hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine
MS ..... matrix spike
MSD ..... matrix spike duplicate
ORP ..... oxidation-reduction potential
PAH ..... polyaromatic hydrocarbon
PCB ..... polychlorinated biphenyl
QAPP ..... Quality Assurance Project Plan
QC ..... quality control
RCRA ..... Resource Conservation and Recovery Act
RDX hexahydro-1,3,5-trinitro-1,3,5-triazine
RFI ..... RCRA facility investigation
RPD ..... relative percent difference
RSL ..... regional screening level
SAP ..... Sampling and Analysis Plan
SDG ..... sample delivery group
SVOC ..... semi-volatile organic compound
SWMU ..... solid waste management unit
TDEC ..... Tennessee Department of Environment and Conservation
TNT ..... trinitrotoluene
TNX hexahydro-1,3,5-trinitroso-1,3,5-triazine

TWP ..... temporary well point
VOC ..... volatile organic compound
WWII ..... World War II
yd^3 ..... cubic yards

EXECUTIVE SUMMARY

This report documents the results of the 2018 Site-Wide Long-Term Monitoring/Long-Term Operations (LTM/LTO) Program at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee (U.S. Environmental Protection Agency [EPA] Identification Number TN521-002-0421). The results presented herein were prepared by Bay West LLC (Bay West) and Leidos under Bay West's performance-based contract W91278-12-D-0007, Task Order CK01, with the U.S. Army Corps of Engineers, Mobile District. This report was prepared consistent with the Resource Conservation and Recovery Act (RCRA) and other federal or state regulations that govern environmental restoration activities at HSAAP.

Groundwater monitoring conducted in 2018 comprised the fourteenth year of LTM under the performance-based contracts. The 2018 LTM/LTO Program focused on the implementation of LTM specified in the final remedy for Area of Concern – Site-Wide Groundwater (AOC-GW), which is outlined in the *Corrective Measures Report for AOC-GW, Site-Wide Groundwater (HSAAP-33), Holston Army Ammunition Plant, Kingsport, Tennessee* (Bay West and SAIC, 2007c) and updated in the Corrective Action Order (CAO) that went into effect on January 24, 2013 (TDEC, 2013). In addition, surface water monitoring was added to the LTM/LTO Program based on the CAO. Specific monitoring objectives included the following:

- Continued monitoring of contaminant trends and groundwater quality conditions (benzene, methylene chloride, and naphthalene) downgradient of Area A legacy sources.
- Evaluation of semi-volatile organic compounds (bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, naphthalene, and n-nitrosodiphenylamine) and RCRA metals (arsenic and lead) concentration trends and monitoring for evidence of migration in wells downgradient of solid waste management units (SWMUs) 19/29 (wells MW-48, MW-114, MW-115, and MW-116).
- Evaluation of hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), degradation parameters (DNX, MNX, and TNX), arsenic, and chromium concentration trends in boundary well MW-68, located at the downgradient boundary of SWMU 20.
- Evaluation of mercury concentration trends in well MW-70, located downgradient of SWMU 18.
- Monitoring of groundwater quality for chlordane, dieldrin, and bromacil following completed source soil removal actions at pesticide-contaminated areas (SWMUs 77/78/86/87and SWMU 88).
- Evaluation of explosives concentration trends (e.g., 2,4-dinitrotoluene [DNT]; 2,6-DNT; 2,4,6-trinitrotoluene [TNT]; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) in the Area B explosives production area (well MW-99).
- Continued monitoring for evidence of target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) contaminant migration at wells located along the downgradient boundary of the Area B production area (GM-12, GM-14, MW-11, MW-11B, MW-91, MW-91B, MW-101, MW-101B, MW-102, MW-102B, MW-S1A, and STMW-15).
- Evaluation of degradation and attenuation of RDX at specified monitoring locations (wells MW-68 and MW-99).

- Monitoring for evidence of benzene, toluene, ethylbenzene, and xylenes (BTEX) contaminant releases to groundwater at SWMU 50 (Burning Ground; boundary well STMW-15).
- Collection of Holston River surface water samples for CAO-listed target analytes to monitor for potential impacts to the Holston River from groundwater discharge.

The 2018 LTM/LTO Program included spring 2018 (wet season) and fall 2018 (dry season) sampling events at a total of up to 27 groundwater monitoring wells located throughout HSAAP. In addition, during the spring 2018 event, three surface water samples were collected. Sampling activities were conducted in accordance with Field Work Orders prepared as addenda to approved site-wide project work plans. All detected analytes in groundwater are compared to the maximum contaminant levels (MCLs). If no MCL is available for a detected analyte, the EPA regional screening level (RSL) is used as the screening criterion. Bromacil does not have an MCL or EPA RSL; therefore, the EPA lifetime health advisory (LHA) is used as the screening criterion. Per the CAO, target analytes detected in boundary wells also are compared to CAO-listed groundwater protection standards (GWPSs) (Table G-3 of the CAO, as provided in **Appendix C**). For surface water, target analytes are screened against the lowest Tennessee water quality criteria, as listed in Table G-3 of the CAO.

The 2018 sampling yielded sufficient data to assess the current groundwater conditions near the SWMUs and areas of concern listed below and showed that there is no evidence that groundwater discharge is impacting the Holston River.

The following is a summary of the 2018 LTM sampling events:

- Area A – SWMU 96: Four boundary wells at Area A – SWMU 96 (MW-104, MW-105, MW-106, and MW-107) were sampled in spring and fall 2018 for CAO-listed target analytes benzene, methylene chloride, and naphthalene. The following is a summary of those results:
    - None of the target analytes were detected in Area A – SWMU 96 boundary monitoring wells during either the spring or fall 2018 LTM events, except naphthalene in MW-105 during the fall 2018 sampling event at an estimated concentration (0.009J micrograms per liter - µg/L). The target analyte naphthalene has not been detected in these wells for five sampling events. Benzene and methylene chloride have not been detected in these wells in the past ten years.
- Area B Landfill Area – SWMUs 19/29: Interior source area monitoring well MW-48 and boundary monitoring wells MW-114, MW-115, and MW-116 were sampled for CAO-listed target analytes (arsenic, lead, bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, naphthalene, and n-nitrosodiphenylamine) during both the spring and fall 2018 sampling events. The following is a summary of those results:
    - During the spring 2018 sampling event, target analyte naphthalene was detected at interior source area monitoring well MW-48 (0.43 µg/L) above screening criteria (0.14 µg/L). Naphthalene was also detected above screening criteria in fall 2018 (1.9J µg/L) at MW-48. N-Nitrosodiphenylamine was detected in MW-48 above the RSL (10 µg/L) only in spring 2018 (14 µg/L). Bis(2-ethylhexyl)phthalate was detected above the MCL (6 µg/L) in both spring and fall 2018 (8.2J µg/L and 86J µg/L, respectively). Dibenzofuran was detected in MW-48 above the RSL of 5.8 µg/L only in the fall 2018 sampling event (12 µg/L). No other target analytes were detected above criteria in the interior source area monitoring well.

  - No target analytes were detected in boundary wells MW-114, MW-115, and MW-116 above screening criteria (MCLs or RSLs) or GWPSs during either 2018 LTM sampling event.
  - No target analytes were detected in MW-55 above RSLs during the spring 2018 event, which is sampled on a biennial basis in the spring.

- Area B Landfill Area – SWMU 20: Boundary monitoring well MW-68 was sampled for CAO-listed target analytes (arsenic, total chromium, and RDX) during both the spring and fall 2018 sampling events. In addition, well MW-68 was sampled for RDX degradation parameters (DNX, MNX, and TNX) only during the spring 2018 sampling event. The following is a summary of those results:
  - Target analytes arsenic and total chromium were not detected in well MW-68 above screening criteria or GWPSs. Neither of these metals have been detected above screening criteria for ten events.
  - The explosive RDX was detected at well MW-68 in spring 2018 at a concentration of 20 µg/L and in fall 2018 at a concentration of 30 µg/L. Both concentrations exceeded the EPA RSL (0.61 µg/L); however, they did not exceed the GWPS of 1,037 µg/L. Trend analysis demonstrates that the RDX concentrations at well MW-68 exhibit a high degree of event-to-event variability. Statistical trend analysis (Mann-Kendall U-Test) of the well MW-68 RDX data set indicates no significant trend at either the 80 percent (%) or 90% confidence level.
  - Two of the three nitroso degradation intermediates of RDX were detected in well MW-68 during the spring 2018 LTM event: MNX at a concentration of 0.59 µg/L, and TNX at a concentration of 0.063J µg/L. The occurrence of these compounds is positive evidence of active anaerobic microbial transformation processes.
- Area B Production and Shop Area – SWMU 18: One interior/source well (MW-70) at SWMU 18 was sampled in spring 2018 for the CAO-listed target analyte mercury. The following is a summary of those results:
  - Mercury was detected at 1.6 µg/L, which is below the MCL of 2.0 µg/L. Statistical trend analysis (Mann Kendall U-Test) of the well MW-70 mercury data between 2000 and 2018 indicates a statistically significant declining trend at the 90% confidence level.
- Area B Production and Shop Area – SWMUs 77/78/86/87 and SWMU 88 (Pesticide Areas): Two interior/source area wells at SWMUs 77/78/86/87 (MW-73 and MW-75) and one interior/source area well at SWMU 88 (MW-86) were sampled in spring 2018 for CAO-listed target analytes dieldrin, alpha- and gamma-chlordane, and bromacil. The following is a summary of those results:
  - Dieldrin was detected above its EPA RSL (0.0015 µg/L) at well MW-73 at a concentration of 0.42 µg/L and at well MW-75 at a concentration of 0.12J µg/L. Dieldrin was not detected in well MW-86 during the spring 2018 sampling event. This is the eleventh sampling event that dieldrin was not detected in well MW-86.
  - Total chlordane was detected at well MW-73 at a concentration of 0.20 µg/L and at well MW 75 at a concentration of 0.84J µg/L. The 2018 total chlordane results for these wells are below the MCL of 2 µg/L. Total chlordane was not detected in well MW-86 during the spring 2018 sampling event. This is the eleventh sampling event that total chlordane was not detected in well MW-86.

- Bromacil was detected in well MW-86 at a concentration of 48 µg/L, which is less than the EPA LHA of 70 µg/L. The spring 2018 sampling event represents the ninth year that the bromacil results in well MW-86 are below screening criteria. In spring 2018, bromacil was not detected in wells MW-73 or MW-75 above criteria. This is the sixth sampling event (2006, 2014, 2015, 2016, 2017, and 2018) that bromacil was not detected above criteria in wells MW-73 and MW-75.

- Area B Production and Shop Area – Explosives Production Area: Groundwater well MW-99 within the explosives production area was sampled in spring 2018 for CAO-listed target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) and RDX first-stage degradation products (TNX, DNX, and MNX). The following is a summary of those results:
  - RDX was detected in the field duplicate sample at a concentration of 660 µg/L (620 µg/L in the associated primary sample), which exceeds the EPA RSL (0.61 µg/L). This is consistent with historical data for the well. Statistical trend analysis (Mann-Kendall U-Test) of the well MW-99 RDX data set currently indicates a decreasing trend at the 90% confidence level. Concentrations of RDX in well MW-99 have been decreasing since April 2008, which may be due, in part, to demolition of Building H8 and associated soil excavation.
  - With the exception of RDX, none of the CAO-listed target analyte explosives were detected above criteria.
  - All three of the nitroso degradation intermediates of RDX (DNX, MNX, and TNX) were detected in well MW-99 during the spring 2018 LTM event. The occurrence of these compounds is positive evidence of active anaerobic microbial transformation processes.

- Area B Production and Shop Area – Boundary Wells: All unconsolidated boundary wells (MW-11, MW-91, MW-101, MW-102, MW-S1A, and STMW-15) were sampled for CAO-listed target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) during the spring 2018 sampling event. Bedrock boundary wells (GM-12, GM-14, MW-11B, MW-91B, MW-101B, and MW-102B) were also sampled in spring 2018 because they are sampled on a biennial basis in the spring of even-numbered years (i.e., 2016, 2018, 2020). In addition, one boundary monitoring well downgradient of SWMU 50 (STMW-15) was also sampled for BTEX. The following is a summary of those results:
  - RDX was not detected in any of the boundary wells sampled. The distribution of current and historical RDX detections in Area B is presented on **Figure 4-7**. No other target analyte explosives were detected in the boundary wells.
  - No BTEX compounds were detected at well STMW-15 located at the active burn area associated with SWMU 50.

- Holston River Surface Water: Surface water samples were analyzed for all CAO-listed target analytes (arsenic; total chromium; lead; mercury; dieldrin; alpha- and gamma-chlordane; bromacil; benzene; methylene chloride; bis[2-ethylhexyl]phthalate; dibenzofuran; fluorene; 2-methylnaphthalene; naphthalene; n-nitrosodiphenylamine; 2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) during the spring 2018 sampling event. The following is a summary of the 2018 LTM results:
  - RDX was not detected in the Holston River at upgradient surface water sample location SW-01. Downgradient of the industrial wastewater treatment plant (IWTP) discharge

point (surface water sample location SW-02), RDX was detected at a concentration of 2.0J µg/L (1.7 µg/L in the associated field duplicate sample). At the location downgradient of HSAAP (SW-03), RDX was detected at a concentration of 0.27 µg/L. While the RDX concentration at SW-02 exceeded the lowest water quality criterion of 0.61 µg/L (the EPA RSL), there is no evidence that groundwater discharge from Area B is contributing to the elevated RDX concentrations reported in the Holston River, but rather, they are the result of upstream permitted HSAAP discharges. Note that the grab surface water samples are intended to determine potential impact to surface water from groundwater. These samples are not representative of Holston River surface water. Surface water sample SW-02 is likely too close to the IWTP to allow for proper mixing. The TDEC-required methodology of collecting a mixed cross-sectional surface water sample would be needed to characterize the surface water.

- No other target analytes were detected in surface water above screening criteria.
- Results of the surface water sampling indicate that there is no impact to the Holston River water quality as a result of groundwater discharge.
- Due to limited data, statistical analysis of surface water concentration trends cannot be conducted until at least 10 sampling events have been conducted; however, a comparison of the fall 2013, spring 2014, fall 2015, spring 2016, fall 2017 and spring 2018 surface water sample results is provided.

The LTM/LTO Program includes inspections and maintenance activities associated with landfill caps, inspections of aprons and catch basins associated with SWMU 3, and inspections of the groundwater monitoring network. Eight landfill cap inspections and four Land Use Control Implementation Plan (LUCIP) inspections were conducted in 2018 by Bay West and Leidos. In addition, HSAAP conducted landfill inspections and LUCIP inspections at 10 other sites. In 2018, coal tar removal was conducted at SWMUs 4, 14, 96, and 103 and settlement areas were filled in and landscaped at SWMU 18. No monitoring wells were abandoned in 2018.

LTM Recommendations

The following LTM recommendations are proposed for calendar year 2019:

- The 2019 LTM/LTO Program should continue as specified in the final remedy for AOC-GW, which is outlined in the Final Corrective Measures Report (Bay West and SAIC, 2007c) and updated in the CAO that went into effect on January 24, 2013. The 2019 LTM sampling schedule is presented in **Section 6**. Revision of the LTM sampling will be completed as part of negotiations during the next CAO modification submitted in draft form to TDEC on March 6, 2019. Suggested recommendations may include removing wells from the sampling program, eliminating analytes from the sampling program, and reducing the frequency of sampling.
- Annual Holston River surface water monitoring at three locations: upgradient of Area B, downgradient of the IWTP discharge, and downgradient of Area B. Per the CAO, Holston River surface water sampling will be conducted in fall 2019.
- Continue semiannual inspections of monitoring wells included in the LTM/LTO Program.
- Complete monitoring well maintenance as needed, including replacement of any wear-and-tear items (e.g., dedicated tubing) where necessary.

LTO Recommendations

The following LTO recommendations are proposed for calendar year 2019:

- Continue semiannual inspections of the eight landfills and coal tar sites.
- Continue LUCIP inspections of the two pesticide sites, SWMU 3, and SWMU 109.
- Maintain the landfill components (e.g., caps, drainage controls, vegetative covers, and signs) as needed.
- Remove coal tar, as needed, at coal tar sites SWMUs 4, 14, 26, 96, and 103.

Both the LTM and LTO activities continue to protect human health and the environment by preventing exposure to contaminated materials. The groundwater LTM program is providing confirmation that contaminants are not migrating. The landfill inspections are identifying repairs needed to maintain the integrity of the caps. The land use control inspections are monitoring for unauthorized excavation at sites where waste remains in place.

1.0 INTRODUCTION AND PURPOSE

This report documents the results of the 2018 Site-Wide Long-Term Monitoring/Long-Term Operations (LTM/LTO) Program at the Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee (U.S. Environmental Protection Agency [EPA] Identification Number TN521-002-0421). The results presented herein were prepared by Bay West LLC (Bay West) and Leidos under Bay West's performance-based contract W91278-12-D-0007, Task Order CK01, with the U.S. Army Corps of Engineers, Mobile District. This report was prepared consistent with the Resource Conservation and Recovery Act (RCRA) and other federal or state regulations that govern environmental restoration activities at HSAAP.

The LTM component of the program included groundwater monitoring for performance assessment of corrective actions for Area of Concern – Site-Wide Groundwater (AOC-GW) that address groundwater plumes associated with the HSAAP production areas and other solid waste management units (SWMUs), such as landfills. The objectives for AOC-GW LTM are further outlined in **Section 3.0**. Monitoring was also performed to evaluate long-term contaminant trends, migration patterns, and degradation of explosives in groundwater. Per the Corrective Action Order (CAO) that went into effect on January 24, 2013 (TDEC, 2013), surface water sampling of the Holston River also was conducted as part of the LTM component of the program.

The LTO component of the program included inspections and maintenance activities associated with landfill and coal tar area caps, aprons and catch basins at SWMU 3, and the groundwater monitoring network.

2.0 HOLSTON ARMY AMMUNITION PLANT BACKGROUND INFORMATION

2.1 SITE DESCRIPTION

HSAAP consists of two plant areas referred to as Area A and Area B (**Figure 2-1**). Area A is located within the city of Kingsport in Sullivan County, Tennessee, on State Route 93. Area B is located in Hawkins County about 4 miles west of downtown Kingsport, Tennessee, on U.S. Route 11W. Area A and Area B are linked by a fenced interplant railroad that is approximately 3.7 miles long (**Figure 2-1**). Industrial wastewater and weak acetic acid were conveyed between the two areas by above- and below-ground piping that is located along the interplant railroad (USACHPPM, 2000). Government-acquired easements for this corridor total approximately 86 acres. Area A, which is the smaller of the two areas, is 68.11 acres. Area B is 5,912 acres and contains the explosives production area. The detailed site history, mission, and plant status have been presented in many previous reports (USACHPPM 2002a, 2002b, 2003a, 2003b, 2004a, 2004b, 2004c) and are not repeated in this report.

Area A of HSAAP is located within a heavily industrialized area of Kingsport adjacent to several private-sector, commercial industrial facilities. The nearest residential community is 0.2 miles from Area B of the plant. During most of the history of HSAAP, the region around Area B has been residential and agricultural in nature with limited commercial development. Since the early 1980s, residential and commercial developments have increased significantly around Area B, particularly around Route 11W. Residential developments abut the northeast and northwest plant boundaries of Area B. Highway 11W separates Area B from the majority of residential and commercial areas that are located in the Church Hill and Mount Carmel communities. The Sullivan Gardens Community is separated from the southern boundary of Area B by sections of the Holston River Mountain, Bays Mountain, and Bays Mountain Park (USACHPPM, 1997).

2.2 TOPOGRAPHY AND GEOLOGY

HSAAP is located in the Tennessee section of the Valley and Ridge physiographic province. The province is characterized by folded and faulted strata that form variable-sized ridges and valleys (USATHAMA, 1980). Area A lies within the floodplain of the South Fork of the Holston River. The Holston River roughly bisects Area B from northeast to southwest and is flanked by a narrow floodplain on the south and somewhat broader floodplain on the north. Elevations range from 2,200 feet (ft) above mean sea level (AMSL) at the Holston River Mountain in the southwestern corner of the Installation in Area B to 1,200 ft AMSL along the Holston River on the western border of the Installation.

Area A and most of the developed portions of Area B (e.g., shop area, nitric acid area, and explosives production area) are located on terraces and the floodplain of the Holston River. The southern half of the plant production area is located within the 500-year floodplain of the Holston River. Karst topography occurs in the northwestern portion of Area B, and resistant sandstone ridges underlie the Holston River Mountain along the southern facility boundary south of the Holston River.

The bedrock geology of the Valley and Ridge province includes Pre-Cambrian to Pennsylvanian sandstones, shales, limestones, and dolomites. Structural features of the Valley and Ridge province include complex folds and overlapping thrust faults. Resistant sandstones and dolomites commonly uphold the ridges, while the valleys contain less-resistant shale and limestone.

The major bedrock formations that underlie HSAAP are the Ordovician-age Mascot Dolomite, Lenoir Limestone, Blockhouse Shale, and the Sevier Shale (**Figure 2-2**). The Sevier Shale underlies all of Area A. The Blockhouse Shale and Sevier Shale underlie most of Area B (Brent 1993; Helton, no date). These shale units are very similar in appearance. The northern boundary of Area B is underlain by a band of the Mascot Dolomite and Lenoir Limestone (Brent 1993; Helton, no date). The Bays Formation underlies the southern boundary of Area B along the north flank of the Holston River Mountain. The Bays Formation is a white to light yellow sandstone with interbedded shale. Quaternary sediment makes up the Holston River floodplain alluvium and terrace deposits (USAEHA, 1980).

The major bedrock structural features near HSAAP are the Bays Mountain Synclinorium and the Cliffs Fault. Seismic activity in the northeast region of Tennessee is moderate to small based on the U.S. Geological Survey National Seismic Mapping Project.

2.3 HYDROGEOLOGIC FRAMEWORK

2.3.1 Groundwater

Groundwater underlying HSAAP is present in both the alluvium and the sedimentary bedrock. In the alluvium, groundwater most commonly occurs under unconfined conditions; although, it can occur in confined conditions in the presence of fine sediment layers. Groundwater also moves through the alluvium along streams and rivers, through sediments deposited as river terraces, and residuum of weathered material that overlies most of the bedrock. In the aquifers of the Valley and Ridge province, groundwater is stored in and moves through fractures, bedding planes, and solution openings of the rocks (USGS, 1995). In some carbonate bedrock formations, these structural features become enlarged as solution channels and develop into sinkholes, where they intercept the ground surface.

Groundwater that occurs in the alluvial and terrace deposits in Area B is hydraulically connected to the groundwater that occurs in the uppermost fractured and weathered zone of the underlying shale and carbonate rocks (USACHPPM 2003a, 2003b). At HSAAP, sinkholes are observed in the Mascot Dolomite along the northern border of Area B. Groundwater flow within the Sevier Shale, underlying the majority of both areas of HSAAP, is restricted to fractures, some of which may be solutionally enlarged where calcareous zones are present. The upper portion of the formation produces sufficient groundwater for domestic water supply, with about 50 percent (%) of domestic water wells completed in the Sevier Shale, thus obtaining sufficient flow for at least domestic uses within the upper 50 ft (DeBuchananne and Richardson, 1956). Production rates of up to 150 gallon (gal) per minute have been recorded for some wells installed in the formation; higher-yielding wells typically are located adjacent to major rivers and streams. Field data show that, although fractures are present at depth, they are usually sealed by calcium carbonate from circulating groundwater. Even where a fault contact is only 50 to 75 ft below the surface, the shale is usually tightly sealed with secondary calcite. If the desired quantity of groundwater has not been obtained within the first 300 ft, it is generally not worthwhile to drill deeper (DeBuchananne and Richardson, 1956).

The depth to groundwater can vary substantially throughout the facility, with shallower depths occurring at lower ground surface elevations, such as areas near surface water drainage ways, streams, and rivers. In the Area B explosives production area, the average depth to groundwater is approximately 9 ft below ground surface (USACHPPM, 2004c). The general groundwater flow direction beneath both Areas A and B is toward the Holston River, which is a regional hydraulic boundary. Localized groundwater flow vectors in the Area B explosives

production area can be to the southwest, south, or southeast, depending on the specific location relative to the Holston River (USACHPPM, 2004c).

Groundwater flow rates can vary substantially in the unconsolidated material due to heterogeneity (e.g., clay to gravelly and coarse sand) and local groundwater gradients throughout the facility. Based on water levels and slug tests performed during the 2003 Site-Wide Groundwater RCRA Facility Investigations (RFIs), groundwater flow velocities in the unconsolidated material were calculated to range between 2 and 73 ft/year (USACHPPM 2003a, 2003b). Groundwater flow velocities in the unweathered shale bedrock interval were not calculated during previous RFI phases; however, maximum purge rates for bedrock wells were at least as great as, or higher than, those for unconsolidated zones. Vertical hydraulic gradients within the Area B explosives production area are neutral to upward, which serve to limit downward migration and dispersal of contaminants into the deeper unweathered bedrock zones and to encourage flow along permeable pathways within the unconsolidated/weathered bedrock contact zone (Bay West and SAIC, 2007a).

2.3.2 Surface Water

Area A is located adjacent to the South Fork of the Holston River, which flows in a northwest direction past this area (**Figure 2-1**). The river continues to flow for another 3.5 miles in a northwest/west direction before it joins the North Fork of the Holston River, approximately 0.5 miles northeast of Area B. These two forks join to form the Holston River at Holston River Mile 142.2. The Holston River flows south for approximately 1 mile, then gradually changes flow direction to the west, where it flows through Area B. In Area A, surface water drains into the South Fork of the Holston River via Mad Branch, which drains over 1,000 acres, including other industrial areas upstream of Area A. Drainage in Area B, south of the Holston River, originates in the Holston River/Bays Mountain area and flows north and west toward the river via Parker Creek and an unnamed creek. The surface drainage on the north side of the Holston River in Area B reaches the Holston River via Arnott Branch, its tributaries, and several natural or manmade drainage ways that are located throughout the industrial area (USATHAMA, 1980). Flooding in the area was a problem until the Tennessee Valley Authority constructed dams on the river and its tributaries. Flow in the South Fork of the Holston River is regulated by Fort Patrick Henry Dam, located about 5 miles upstream of Area A.

2.4 HISTORICAL SITE-WIDE GROUNDWATER CONTAMINATION SUMMARY – 2001 THROUGH 2017

2.4.1 Area A

As part of the historical Site-Wide Groundwater RFI, monitoring wells MW-22, MW-42, MW-1401, MW-103, MW-104, MW-105, MW-106, and MW-107 within Area A were sampled in June 2001 and January 2002 for explosives, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, herbicides, pesticides, and polychlorinated biphenyls (PCBs; USACHPPM, 2002a). In the RFI, explosives were the primary contaminants of concern (COCs) across the site, but none were found in the groundwater at Area A. SVOCs were of potential concern at Area A due to historic disposal and spillage of coal tar and coal tar liquor; however, no SVOCs were detected in these particular wells during the two sampling events. In addition, no herbicides, pesticides, or PCBs were detected. One VOC, chloroform, was detected in well MW-106 above its risk-based screening criterion reported in the RFI.

During the 2003 phase of the historical Site-Wide Groundwater RFI, including the July 2002 and January 2003 sampling events, analyses were conducted only for VOCs and SVOCs (USACHPPM 2003a, 2003b). The 2003 phase of sampling indicated the presence of only chloromethane and chloroform; chloroform exceeded its risk-based screening criterion used in the RFI in well MW-106 on a consistent basis. The presence of chloroform was attributed to the proximity of a large potable water storage tank near the well and potential leakage of public supply potable chlorinated water. Removal of Area A from the site-wide groundwater monitoring effort was recommended at this time due to the absence of site-wide COCs. Area A groundwater was not analyzed during the February 2004 phase of the Site-Wide Groundwater RFI.

Monitoring of four wells (MW-104, MW-105, MW-106, and MW-107) at SWMU 96 (Gas Producer Coal Tar Storage Tanks) under the 2005 and 2006 LTM/LTO Program indicated the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX) and a few SVOCs in groundwater. Only benzene was detected consistently above its risk-based screening criterion in two wells. However, since 2008, benzene has not been detected in the four monitoring wells sampled at Area A. Since 2008, chloroform is the only VOC detected above its risk-based screening criterion; however, chloroform concentrations did not exceed the maximum contaminant level (MCL). In addition, chloroform is not a target analyte per the 2013 CAO (TDEC, 2013). Sporadic detections of bis(2-ethylhexyl)phthalate, naphthalene, and methylene chloride also occurred above their respective risk-based screening criteria between 2005 and 2006. From 2008 to 2013, periodic detections of SVOCs (primarily polyaromatic hydrocarbons [PAHs]) have been detected above risk-based screening criteria; however, these PAHs are not target analytes per the 2013 CAO. Between 2014 and 2017, none of the target analytes per the CAO (naphthalene, benzene, and methylene chloride) were detected in Area A wells above screening criteria (MW-104, MW-105, MW-106, and MW-107).

2.4.2 Area B – Maintenance and Production Areas

Groundwater in the maintenance and production areas was sampled during five events between January 2001 and February 2004 as part of the historical Site-Wide Groundwater RFI. Analyses were conducted for explosives, VOCs, SVOCs, metals, herbicides, pesticides, and PCBs at various wells depending on the location and operational history of adjacent source areas (USACHPPM, 2002a). **Figure 3-1** illustrates the locations of SWMUs within Area B.

The explosive hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) was detected in groundwater in 20% of all sampled Area B monitoring wells between 2001 and 2004, many with concentrations exceeding the risk-based screening criterion (EPA regional screening level [RSL] of 0.61 micrograms per liter [µg/L]). The maximum RDX values occurred at well MW-99 (Building H8 vicinity), with historical concentrations as high as 2,200 µg/L. Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) was detected in eight wells, with the highest concentration also occurring at well MW-99; however, all concentrations were below the EPA RSL of 1,800 µg/L. Explosives were not detected in the bedrock wells, and no VOCs or SVOCs of significance were detected. Mercury was consistently detected in groundwater downgradient of SWMU 18 (Closed Sanitary Landfill, well MW-70) above its risk-based screening criterion (EPA lifetime health advisory [LHA] of 2 µg/L). Pesticides and herbicides were detected in groundwater at SWMUs 77/78/86/87 (Pesticide Areas at Building 148, well MW-73). The pesticides dieldrin and chlordane (total) were detected above their respective risk-based screening criteria of 0.0042 and 0.19 µg/L, respectively; no other pesticides or herbicides exceeded their risk-based screening criteria. Historically, bromacil was detected in groundwater at SWMU 88 (World War II [WWII] Pesticide Wash-Down Area, well MW-86) above its LHA of 70 µg/L; however, bromacil

has not been detected in this well above the LHA since 2010. Fuel-related contaminants (e.g., BTEX constituents) occurred in groundwater in the vicinity of the Building 105 Fuel Station (referred to as Area of Concern [AOC]-C) above risk-based screening criteria but below site-specific cleanup levels established consistent with Tennessee Department of Environment and Conservation (TDEC) underground storage tank rules.

A site-wide groundwater interim measures investigation of the production area at Area B was conducted in May and June of 2003, which included the installation of 50 temporary well points (TWPs) (USACHPPM, 2004a). The investigation evaluated the extent of explosives contamination at Area B and found that RDX concentrations had remained consistently high at well MW-99. RDX persisted at several wells throughout the site, as well as in samples collected from TWPs installed during the investigation. HMX also was detected across Area B, with the highest concentration found at well MW-99. In addition, low concentrations of 2,4-dinitrotoluene (DNT) and 2,4,6-trinitrotoluene (TNT) were detected in several of the TWPs, with only one detection of 2,4,6-TNT above the screening criterion (EPA LHA of 2 µg/L).

An addendum to the interim measures investigation (USACHPPM, 2004c) was completed in March and April of 2004 to continue to map the extent of RDX contamination in the Area B production area. This phase of the interim measures investigation included the installation and sampling of 49 additional TWPs and sampling of previously installed TWPs and selected monitoring wells. RDX was detected in 5 of 12 wells sampled and in 51 of 86 TWPs. HMX was detected in many of the same locations as RDX, including 5 of 12 wells sampled and 40 of 86 TWPs sampled, but at lesser concentrations. The well MW-99/Building H8 vicinity was again confirmed to have the highest RDX detections. The TWP monitoring results indicated that RDX was present in groundwater near multiple former and current production buildings. The conceptual model for contaminant fate and transport did not indicate a large single plume, but rather many smaller areas of contamination associated with multiple points of release (e.g., buildings, sumps and associated pipelines, and waste management units) over time. The interim measures investigation confirmed that shale bedrock is typically very shallow throughout the production area. The interim measures investigation also identified the southernmost reaches of several surface ditches as potential groundwater discharge zones; although, evaluation of the amount of discharge could not be quantified due to the high volumes of non-contact cooling water that flow almost continuously through many of the ditches.

An additional phase of the historical site-wide groundwater RFI was conducted in late 2005 and 2006, which included the installation of new permanent and temporary monitoring wells to further bound and delineate the extent of contamination in the Area B explosives production area (Bay West and SAIC, 2007a). This RFI phase indicated that explosives have not migrated beyond the production area and further documented that groundwater is not a source of explosives to surface water ditches within the production area. Sampling of boundary wells since 2008 confirms that groundwater is not a source of explosives to surface water.

2.4.3 Area B – Landfill Area

During the 2002 phase of the historical Site-Wide Groundwater RFI, several wells in the westernmost portion of Area B were sampled, including SWMU 17 (Closed Sanitary Landfill), SWMUs 19/29 (Construction/Demolition Landfill and Sedimentation Basin), SWMU 20 (Rock Quarry Landfill), SWMU 21 (Rock Dam Landfill) and SWMU 25 (Area B Tar Burial Site; **Figure 3-1**). This portion of Area B is collectively referred to as the Landfill Areas for the purposes of this report. Analytes included explosives, VOCs, SVOCs, and metals.

RDX was detected above its risk-based screening criterion in the bedrock wells near SWMU 20 (well MW-68) in both the June 2001 and January 2002 sampling events. No VOCs of significance were detected, but the SVOC bis(2-ethylhexyl)phthalate was detected in two wells near SWMUs 19/29 and SWMU 17 (upgradient well MW-55 and downgradient well MW-48, respectively). Detections of bis(2-ethylhexyl)phthalate ranged from about 15 to 25 µg/L and exceeded its risk-based screening criterion used in the RFI (EPA RSL of 4.8 µg/L). Bis(2-ethylhexyl)phthalate was not detected during later sampling events. During the 2003 and 2004 phases of the historical Site-Wide Groundwater RFI, the explosive RDX continued to be detected in well MW-68 at SWMU 20, and a downward trend was noted.

Since 2004, site-specific RFIs have been completed for SWMUs 19/29, SWMU 20, and SWMU 25 (Bay West and SAIC 2006a, 2005c, 2006b, 2006c). These investigations documented that the extent of migration of explosives and metals contaminants at SWMU 20 and SVOC and VOC contaminants near SWMUs 19/29 is limited. The SWMU 25 RFI documented the absence of coal tar-related contaminants in soil adjacent to SWMU 25. An AOC-GW RFI Addendum, consisting of installation and sampling of a well downgradient of SWMU 25, documented the absence of coal tar-related SVOCs and metals above risk-based screening criteria in groundwater downgradient of this site (Bay West and SAIC, 2007b). In 2013, a coal tar removal action was completed at SWMU 25.

Between 2008 and 2017, RDX has continued to exceed risk-based screening criteria in well MW-68; however, concentrations of RDX did not exceed groundwater protection standards (GWPSs) established in the 2013 CAO. SVOCs were primarily detected in monitoring wells MW-48 and MW-115 at low estimated concentrations; however, occasionally, some of the PAHs exceeded risk-based screening criteria. However, none of the PAHs in boundary wells exceed GWPSs. Since 2008, arsenic is often detected above the MCL in monitoring well MW-48; however, arsenic has not been detected above the MCL in any of the boundary wells.

3.0 2018 SITE-WIDE MONITORING

3.1 2018 MONITORING OBJECTIVES AND LOCATIONS

3.1.1 Groundwater

Groundwater monitoring conducted in 2018 comprised the fourteenth year of LTM under performance-based contracts. The 2018 LTM/LTO Program objectives, as delineated in the *Corrective Measures Report for AOC-GW, Site-Wide Groundwater (HSAAP-33), Holston Army Ammunition Plant, Kingsport, Tennessee* (Bay West and SAIC 2007c) and as further refined in the 2013 CAO (TDEC, 2013), included the following:

- Continued trending of key contaminants at specific SWMUs (e.g., landfills) and within the Area B explosives production area.
- Monitoring for key contaminants at boundary wells located along the downgradient perimeter of the Area B explosives production area.
- Monitoring for key contaminants at boundary wells located along the downgradient perimeter of Area A.
- Collecting data to evaluate degradation and attenuation of explosives at specified monitoring locations in Area B.

Specific areas of focus for 2018 groundwater monitoring included the following:

- Continued monitoring of contaminant trends and groundwater quality conditions (benzene, methylene chloride, and naphthalene) downgradient of Area A legacy sources.
- Evaluation of SVOCs (bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2-methyl-naphthalene, naphthalene, and n-nitrosodiphenylamine) and RCRA metals (arsenic and lead) concentration trends and monitoring for evidence of migration in wells downgradient of SWMUs 19/29 (wells MW-48, MW-114, MW-115, and MW-116) and background monitoring well MW-55. In addition, background monitoring well MW-55 is also analyzed for total chromium.
- Evaluation of RDX, arsenic, and chromium concentration trends in well MW-68, located at the downgradient boundary of SWMU 20.
- Evaluation of mercury concentration trends in well MW-70, located downgradient of SWMU 18.
- Monitoring of groundwater quality for chlordane, dieldrin, and bromacil following completed source soil removal actions at pesticide-contaminated areas (SWMUs 77/78/86/87 and SWMU 88).
- Evaluation of explosives concentration trends (e.g., 2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) in the Area B explosives production area (well MW-99).
- Continued monitoring for evidence of explosives contaminant migration (e.g., 2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) at wells located along the downgradient boundary of the Area B explosives production area.
- Evaluation of degradation and attenuation of RDX at the SWMU 20 boundary well (MW-68) and the Area B explosives production area (well MW-99).

- Monitoring for evidence of BTEX contaminant releases to groundwater at SWMU 50 (Burning Ground; boundary well STMW-15).

3.1.2 Surface Water

Per the 2013 CAO, Holston River surface water sampling was conducted as part of the 2018 LTM/LTO Program. The primary objective of the surface water sampling was to determine if there are any target analytes in groundwater potentially discharging to the Holston River and impacting the river quality.

Specific areas of focus for 2018 surface water monitoring included the following:

- Monitoring of contaminant trends and surface water quality conditions for specific VOCs, SVOCs, RCRA metals, pesticides, bromacil, and explosives.
- Samples were collected upgradient of Area B, downgradient of the industrial wastewater treatment plant (IWTP) discharge, and downgradient of Area B in spring 2018.

3.1.3 Sampling Locations

Locations and analytes for each monitoring event were established in the Final Corrective Measures Report (Bay West and SAIC, 2007c). Field Work Orders (FWOs) were distributed to the Army and TDEC approximately 30 days prior to each sampling event for informational purposes. Formal Army and TDEC approval of FWOs is not required under the Facility Action Plan; however, comments or suggestions were considered when establishing monitoring objectives.

Table 3-1 presents the groundwater and surface water monitoring locations for the spring and fall 2018 LTM sampling events. **Figure 3-1** and **Figure 3-2** illustrate the locations of Area B and Area A monitoring wells, respectively, sampled during 2018. **Figure 3-3** illustrates the surface water sampling locations sampled in spring 2018. **Appendix A** summarizes the 2018 water level measurements collected during groundwater sampling events (**Appendix A.1**), groundwater and surface water sampling logs (**Appendix A.2** and **Appendix A.3**, respectively), and monitoring well inspection forms (**Appendix A.4**). **Appendix B** contains the analytical laboratory data packages and associated data validation records. Groundwater and surface water samples were collected from all locations as planned in the 2018 FWOs.

3.2 FIELD SAMPLING METHODS

Groundwater and surface water sampling was conducted in accordance with procedures specified in the approved *Site Sampling and Analysis Plan, Holston Army Ammunition Plant, Kingsport, Tennessee* (Bay West and SAIC, 2005a) and the associated FWOs. The sections below summarize the sampling protocols used during the 2018 LTM/LTO Program.

3.2.1 Monitoring Well Purging and Sampling

Prior to purging and sampling an existing monitoring well, the integrity of the well was checked. The well was visually inspected, and its condition documented on a well inspection form during each sampling event. Copies of well inspection forms are found in **Appendix A.4**. Upon completion of the inspection and after allowing the groundwater to equilibrate, the water level was measured at each well to the nearest 0.01 ft with a battery-powered water level indicator, as described in Section 5.3.3.1 of the Site-Sampling and Analysis Plan (SAP; Bay West and SAIC, 2005a) (**Appendix A.1**).

Once the water level was measured, an initial measurement of field parameters, consisting of pH, temperature, conductivity, turbidity, oxidation-reduction potential (ORP), and dissolved oxygen (DO), was conducted. After initial measurement of field parameters, purging of each monitoring well commenced. Purging of monitoring wells was accomplished using one of two methods: (1) micropurging using a bladder pump and measurement of water quality parameters using a Horiba U-22 water quality meter equipped with a flow cell where conditions allowed, or (2) conventional purging with a Teflon® bailer when micropurging could not be utilized.

Where micropurging methods were employed, purging was conducted until a minimum of two pump and tubing volumes were removed, or until pH, conductivity, DO, and temperature reached equilibrium, as described in Section 5.3.4.2 of the Site SAP (Bay West and SAIC, 2005a). For some wells, minimal drawdown could not be achieved even by reducing pump rates to below 40 milliliters per minute (mL/min). In these cases, conventional purging was performed using a Teflon® bailer, and the wells were purged to dryness. For wells purged to dryness, no water quality parameters (pH, conductivity, DO, and temperature) were collected due to the limited volume of water available and because the water is not representative of actual groundwater quality. If a monitoring well was purged to dryness, sampling was delayed for a time period of up to 24 hours (hr) to allow for recharge.

For wells purged using micropurge methods, samples were collected by filling pre-preserved (as applicable) sample containers from the discharge line of the bladder pump immediately upon completion of purging. When a bailer was used for groundwater sampling, the samples were collected by slowly pouring groundwater from the bailer into pre-preserved (as applicable) sample containers.

Immediately after collection of samples, bottle label information was added, and each sample container was placed into a sealable plastic bag and placed in an ice-filled cooler to ensure preservation.

3.2.2 Surface Water Sampling

Surface water sampling was conducted using the dipper sampling method, as described in Section 5.6.2.1 of the Site SAP (Bay West and SAIC, 2005a). Before beginning sampling, the telescoping handle was extended to the appropriate length. The dipper was then slowly submerged into the water so that minimal disturbance of the sample could be achieved. Prior to filling the sample containers, water quality parameters, including pH, temperature, conductivity, turbidity, ORP, and DO, were collected using a Horiba U-22 meter. After measurement of the water quality parameters, the dipper was refilled, and the surface water samples were collected by slowly pouring the water from the dipper into pre-preserved (as applicable) sample containers.

Immediately after collection of samples, bottle label information was added, and each sample container was placed into a sealable plastic bag and placed in an ice-filled cooler to ensure preservation.

3.2.3 Sample Chain-of-Custody, Packaging and Shipping, and Documentation

Sample chain-of-custody, packaging and shipping, and sample documentation were performed in accordance with specifications in Section 6.0 of the Site SAP. The 2018 chain-of-custody forms are contained on the compact disc located in **Appendix B**.

Table 3-1 HSAAP Spring and Fall 2018 LTM Locations

Area	Source Unit	Location	Parameter	Spring	Fall
Area A	SWMU 96	MW-104	VOCs: • benzene • methylene chloride SVOCs: • naphthalene	X	X
		MW-105	VOCs: • benzene • methylene chloride SVOCs: • naphthalene	X	X
		MW-106	VOCs: • benzene • methylene chloride SVOCs: • naphthalene	X	X
		MW-107	VOCs: • benzene • methylene chloride SVOCs: • naphthalene	X	X
Area B Landfill Areas	Upgradient	MW-55[a]	SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • chromium (total) • lead	X	NS
	SWMUs 19/29	MW-48	SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • lead	X	X

Table 3-1 HSAAP Spring and Fall 2018 LTM Locations (continued)

Area	Source Unit	Location	Parameter	Spring	Fall
Area B Landfill Areas (continued)	SWMUs 19/29 (continued)	MW-114	SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • lead	X	X
		MW-115	SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • lead	X	X
		MW-116	SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • lead	X	X
	SWMU 20	MW-68	RDX MNA[b]: • DNX • MNX • TNX RCRA metals: • arsenic • chromium (total)	X	X

Table 3-1 HSAAP Spring and Fall 2018 LTM Locations (continued)

Area		Source Unit	Location	Parameter	Spring	Fall
Area B Explosives Production and Shop Areas	Installation Boundary Near Holston River	Explosives Production Area SWMUs and AOCs	GM-12[a]	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS
			GM-14[a]	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS
			MW-11	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS
			MW-11B[a]	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS
			MW-91	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS

Table 3-1 HSAAP Spring and Fall 2018 LTM Locations (continued)

Area		Source Unit	Location	Parameter	Spring	Fall
Area B Explosives Production and Shop Areas (continued)	Installation Boundary Near Holston River (continued)	Explosives Production Area SWMUs and AOCs (continued)	MW-91B[a]	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS
			MW-101	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS
			MW-101B[a]	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS
			MW-102	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS

Table 3-1 HSAAP Spring and Fall 2018 LTM Locations (continued)

Area		Source Unit	Location	Parameter	Spring	Fall
Area B Explosives Production and Shop Areas (continued)	Installation Boundary Near Holston River (continued)	Explosives Production Area SWMUs and AOCs (continued)	MW-102B[a]	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS
			MW-S1A	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS
		SWMU 50	STMW-15	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX BTEX: • benzene • toluene • ethylbenzene • xylenes	X	NS
	Interior Source Area Trending/ Corrective Measures Performance	Explosives Production Area	MW-99	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX MNA[b]: • DNX • MNX • TNX	X	NS
		SWMU 18	MW-70	Mercury	X	NS

Table 3-1 HSAAP Spring and Fall 2018 LTM Locations (continued)

Area		Source Unit	Location	Parameter	Spring	Fall
Area B Explosives Production and Shop Areas (continued)	Interior Source Area Trending/ Corrective Measures Performance (continued)	SWMUs 77/78/86/87	MW-73	Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil	X	NS
			MW-75	Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil	X	NS
		SWMU 88	MW-86	Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil	X	NS
Holston River		Upgradient of Area B	SW-01	VOCs: • benzene • methylene chloride SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • chromium (total) • lead • mercury Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS

Table 3-1 HSAAP Spring and Fall 2018 LTM Locations (continued)

Area	Source Unit	Location	Parameter	Spring	Fall
Holston River (continued)	Downgradient of the IWTP Discharge at Area B	SW-02	VOCs: • benzene • methylene chloride SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • chromium (total) • lead • mercury Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS

Table 3-1 HSAAP Spring and Fall 2018 LTM Locations (continued)

Area	Source Unit	Location	Parameter	Spring	Fall
Holston River (continued)	Downgradient of Area B	SW-03	VOCs: • benzene • methylene chloride SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • chromium (total) • lead • mercury Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS

[a]Background well (MW-55) and deep boundary wells (GM-12, GM-14, MW-11B, MW-91B, MW-101B, and MW-102B) are sampled on a biennial basis in the spring of even-numbered years.
[b]MNA analysis performed on an annual basis at this well (spring event only).
AOC = Area of concern.
BTEX = Benzene, toluene, ethylbenzene, and xylenes.
DNX = Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.
HSAAP = Holston Army Ammunition Plant.
IWTP = Industrial wastewater treatment plant.
MNA = Monitored natural attenuation (RDX degradation intermediates: DNX, MNX, and TNX, annual only).
MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.
NS = Not sampled.
RCRA = Resource Conservation and Recovery Act.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SVOC = Semi-volatile organic compound.
SWMU = Solid waste management unit.
TNX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.
VOC = Volatile organic compound.

3.3 LABORATORY METHODS

Groundwater samples were analyzed for target analytes according to the LTM Plan presented in the Corrective Measures Report (Bay West and SAIC, 2007c) and the 2013 CAO. These include select explosives (including RDX), VOCs, SVOCs, RCRA metals, pesticides, bromacil, and selected monitored natural attenuation (MNA) parameters. The MNA parameter group is RDX first-stage degradation compounds (hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine [DNX]; hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine [MNX]; and hexahydro-1,3,5-trinitroso-1,3,5-triazine [TNX]). Surface water samples were analyzed for a variety of parameters according to the 2013 CAO. Analytes for surface water include select explosives (including RDX), VOCs, SVOCs, RCRA metals, pesticides, and bromacil. The laboratory methods used to analyze samples are listed in **Table 3-2**.

Table 3-2 Laboratory Methods for 2018 HSAAP LTM

Analysis		Laboratory Method
Groundwater		
Volatile Organics		EPA SW-846 8260B
Semi-volatile Organics		EPA SW-846 8270D and 8270D SIM
Explosives		EPA SW-846 8330A
RCRA Metals		EPA SW-846 6020A and EPA SW-846 7470A (mercury only)
Pesticides		EPA SW-846 8081B
Bromacil		EPA SW-846 8321
MNA Parameters	RDX First-Stage Degradation Compounds	EPA SW-846 8330B (DNX, MNX, and TNX only)
TCLP Analysis (IDW only)	TCLP Herbicides	EPA SW-846 8151A
	TCLP Metals	EPA SW-846 6010B and EPA SW-846 7470A (mercury only)
	TCLP Pesticides	EPA SW-846 8081B
	TCLP Semi-volatiles	EPA SW-846 8270C
	TCLP Volatiles	EPA SW-846 8260B
Surface Water		
Volatile Organics		EPA SW-846 8260B
Semi-volatile Organics		EPA SW-846 8270D and 8270D SIM
Explosives		EPA SW-846 8330A
RCRA Metals		EPA SW-846 6020A, and EPA SW-846 7470A (mercury only)
Pesticides		EPA SW-846 8081B
Bromacil		EPA SW-846 8321

DNX = Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.
EPA = U.S. Environmental Protection Agency.
HSAAP = Holston Army Ammunition Plant.
IDW = Investigation-derived waste.
LTM = Long-term monitoring.
MNA = Monitored natural attenuation.
MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.
RCRA = Resource Conservation and Recovery Act.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SIM = Selected ion monitoring.
TCLP = Toxicity Characteristic Leaching Procedure.
TNX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.

3.4 QUALITY ASSURANCE/QUALITY CONTROL

Five different types of field quality control (QC) samples were collected or used during performance of the sampling activities: field duplicates, rinsate blanks, source water samples (potable water), matrix spike/matrix spike duplicates (MS/MSD), and trip blanks. Duplicate samples were collected along with both groundwater and surface water samples. The total

number of duplicates was a minimum of 10% of the entire sample population. The QC duplicates were analyzed for the same analytes as the grab samples at the same location.

During the decontamination of sampling equipment used for sample collection, QC rinsate blanks were collected from the sampling equipment used. Each of these blanks was collected after decontamination of the sampling device(s). The blanks were collected by pouring American Society for Testing and Materials (ASTM) Type I or equivalent water over and into the device and collecting the water directly into appropriate sample containers. Sample containers designated for VOC analysis were filled so that no headspace was present. The total number of rinsate blanks collected represented approximately 5% of the entire sample population. The QC rinsate blank sample was analyzed for the same parameters as the next grab sample collected. One field blank sample (potable water) was collected to analyze the water used for decontamination of sampling equipment to determine procedural and atmospheric contamination at the site that may contribute to sample contamination. The field blank sample was analyzed for all parameters being investigated across the site.

The MS/MSD samples were submitted to test the laboratory accuracy and precision. The MS sample indicated the appropriateness of the method for the matrix by measuring the recovery or accuracy, and the MSD sample was a second aliquot of the same sample with known quantities of compounds added. When compared to the MS, the MSD sample was used to determine precision.

Trip blanks used for the project consisted of sealed containers of ASTM Type I or equivalent water provided by the laboratory. One trip blank was placed into each cooler used to store aqueous sample containers designated for VOC analysis. The trip blank remained in the cooler until groundwater or surface water sampling at the site was completed and was shipped offsite within the cooler for chemical analysis by the contracted laboratory.

Daily Chemical Quality Control Contractor Reports (DCQCRs) were prepared, signed, and dated by the site supervisor. These reports summarized the activities performed at the site, the daily weather conditions, samples collected and times, results of field measurements, field calibrations, any deviations from the project objectives, and any communications with government or site personnel. All DCQCRs are maintained in the project file.

3.5 DATA VERIFICATION, VALIDATION, AND MANAGEMENT

As described in Chapter 10.0 of the *Site Quality Assurance Project Plan, Holston Army Ammunition Plant, Kingsport, Tennessee* (Bay West and SAIC 2005b), all samples from this investigation were sent to a National Environmental Laboratory Accreditation Program-accredited laboratory for analysis. TestAmerica Laboratories, Inc. was selected for analysis of VOCs, SVOCs, explosives, pesticides, and metals. Pace Analytical Services, Inc. was selected for analysis of bromacil. Upon completion of analysis, the laboratories prepared analytical and QC documentation and analytical data packages were submitted for all samples. **Appendix B** contains copies of spring 2018 and fall 2018 LTM laboratory data packages. Upon receipt, analytical data were verified by Leidos, and data packages were selected for full validation. A complete description of the data verification/validation process can be found in Section 10.2 of the Quality Assurance Project Plan (QAPP) (Bay West and SAIC 2005b). After verification and validation of the data, an evaluation of the data accuracy, precision, sensitivity, and completeness was performed and documented in Data Quality Summary Reports (DQSRs). Separate DQSRs for each semiannual monitoring event are provided below. Data validation checklists are contained in **Appendix B**. Samples qualified during validation for both the spring and fall 2018 sampling events are provided in **Table 3-3**.

3.5.1 Data Quality Summary Report – Spring 2018 Sampling Event

Samples from 27 monitoring wells and three surface water locations, along with nine field duplicates for various parameters, field QC samples (trip/field/rinsate blanks), and investigation-derived waste (IDW), were collected between March 27 and April 4, 2018. Results that met QC criteria were produced for most investigation sample analyses performed, with the exceptions noted in the following paragraphs. Each monitoring well was sampled for select target analytes that included VOCs, SVOCs, explosives, pesticides, bromacil, and metals (**Table 3-1**).

Naphthalene was detected in an equipment rinsate blank that resulted in the naphthalene result being qualified as undetected (U) in six groundwater results because of a similar detection in the associated sample.

Lead was detected at low levels in the method blanks associated with sample delivery groups (SDGs) 107959 and 108095. As a result, lead was qualified as undetected (U) in two associated samples.

Detected concentrations of the explosive compounds TNX and DNX in groundwater sample CGWMW-098-1014-GW and duplicate CGWMW-099-1015-QA, respectively, were qualified as estimated (J) due to a high percent difference between the primary and confirmation column quantifications. Detected concentrations of the pesticide compound bromacil in groundwater samples CSWSW-003-1029-SW, CSWSW-002-1027-SW, and duplicate CSWSW-002-1028-QA were qualified as estimated (J) due to a high percent difference between the primary and confirmation column quantifications.

Pesticide compounds alpha-chlordane, gamma-chlordane, and dieldrin were qualified as estimated (J) due to low surrogate recovery in sample CGWMW-075-1023-GW and field duplicate sample CGWMW-075-1024-QA.

SVOC compound 2-methylnaphthalene was qualified as estimated (J) in sample CGWMW-048-0993-GW due to high recoveries in the MS and MSD. The associated laboratory control sample (LCS) recoveries were within control limits. Pesticide compounds were qualified as estimated (J/UJ) for alpha chlordane and gamma-chlordane in sample CGWMW-075-1023-GW and alpha-chlordane, gamma-chlordane, and dieldrin in sample CSWSW-002-1027-SW due to low recovery in the MS. The associated MSD and LCS recoveries were within control limits. Explosive compound RDX results was qualified as estimated (J) in groundwater sample CGWMW-002-1027-GW due to low recovery in the MS and high relative percent difference (RPD) for the MS/MSD. The associated LCS and MSD recoveries were within control limits.

No results were qualified because of missed holding times, initial or continuing calibration discrepancies, internal standard areas or retention times outside of criteria, or LCS recoveries outside of control limits.

Field duplicates were collected for monitoring well samples. If a given analyte was not detected in both the regular and field duplicate samples, precision was considered acceptable. The RPD was calculated only when compounds detected in both samples had concentrations greater than five times the reporting level. When one or both sample values were between the reporting level and five times the reporting level, the absolute difference was evaluated. One dibenzofuran, one TNX, and one DNX result did not meet field duplicate acceptance criteria. Out of 67 field duplicate result comparisons, 64 met QC criteria, indicating that sampling and analytical precision were in control. As the field duplicate acceptance criteria provided in the QAPP are intended for general guidance only, field sample results were not qualified based on field duplicate comparisons.

The analytical data for this event are considered to have met data quality objectives, have an established confidence that allows utilization for the project objectives, and provide data for future needs.

Table 3-3 Validated Analytical Results

Station	Sample Identifier	Date Collected	Sample Type	Media	Chemical	Results	Units	Data Qual	Validation Code
Spring 2018									
C-GWMW-SRC	CGWMW-SRC-1030-SB	03/27/18	Field Blank	QC	Lead	0.25	µg/L	U	F01
MW-048	CGWMW-048-0993-GW	03/31/18	Grab	GW	2-Methylnaphthalene	0.0016	µg/L	J	H01
MW-055	CGWMW-055-0995-GW	04/04/18	Grab	GW	Lead	1.1	µg/L	U	F01
MW-075	CGWMW-075-1023-GW	04/03/18	Grab	GW	alpha-Chlordane	0.43	µg/L	J	G02,H02
MW-075	CGWMW-075-1023-GW	04/03/18	Grab	GW	gamma-Chlordane	0.41	µg/L	J	G02,H02
MW-075	CGWMW-075-1023-GW	04/03/18	Grab	GW	Dieldrin	0.12	µg/L	J	G02
MW-075	CGWMW-075-1024-QA	04/03/18	Field Duplicate	GW	alpha-Chlordane	0.28	µg/L	J	G02
MW-075	CGWMW-075-1024-QA	04/03/18	Field Duplicate	GW	gamma-Chlordane	0.26	µg/L	J	G02
MW-075	CGWMW-075-1024-QA	04/03/18	Field Duplicate	GW	Dieldrin	0.1	µg/L	J	G02
MW-099	CGWMW-099-1014-GW	04/04/18	Grab	GW	TNX	0.29	µg/L	J	M08
MW-099	CGWMW-099-1015-QA	04/04/18	Field Duplicate	GW	DNX	1.3	µg/L	J	M08
MW-105	CGWMW-105-0988-GW	04/01/18	Grab	GW	Naphthalene	0.0000054	mg/L	U	F03
MW-106	CGWMW-106-0989-GW	04/01/18	Grab	GW	Naphthalene	0.0000078	mg/L	U	F03
MW-107	CGWMW-107-0990-GW	04/01/18	Grab	GW	Naphthalene	0.0000061	mg/L	U	F03
MW-114	CGWMW-114-0996-GW	03/31/18	Grab	GW	Naphthalene	0.0000071	mg/L	U	F03
MW-115	CGWMW-115-0998-GW	03/31/18	Grab	GW	Naphthalene	0.0000062	mg/L	U	F03
MW-116	CGWMW-116-0999-GW	03/31/18	Grab	GW	Naphthalene	0.0000063	mg/L	U	F03
SW-002	CSWSW-002-1027-SW	04/02/18	Grab	SW	RDX	2	µg/L	J	H02,H04
SW-002	CSWSW-002-1027-SW	04/02/18	Grab	SW	alpha-Chlordane	0.02	µg/L	UJ	H02
SW-002	CSWSW-002-1027-SW	04/02/18	Grab	SW	gamma-Chlordane	0.02	µg/L	UJ	H02
SW-002	CSWSW-002-1027-SW	04/02/18	Grab	SW	Dieldrin	0.02	µg/L	UJ	H02
SW-002	CSWSW-002-1027-SW	04/02/18	Grab	SW	Bromacil	3.4	µg/L	J	M08
SW-002	CSWSW-002-1028-QA	04/02/18	Field Duplicate	SW	Bromacil	2.5	µg/L	J	M08
SW-003	CSWSW-003-1029-SW	04/02/18	Grab	SW	Bromacil	0.34	µg/L	J	M08

Table 3-3 Validated Analytical Results (continued)

Station	Sample Identifier	Date Collected	Sample Type	Media	Chemical	Results	Units	Data Qual	Validation Code
Fall 2018									
C-GWMW-SRC	CGWMW-SRC-1052-SB	10/17/18	Field Blank	QC	RDX	0.13	µg/L	J	M08
C-GWMW-SRC	CGWMW-SRC-1052-SB	10/17/18	Field Blank	QC	Benzene	0.4	µg/L	UJ	A05
C-GWMW-SRC	CGWMW-SRC-1052-SB	10/17/18	Field Blank	QC	Methylene chloride	0.8	µg/L	UJ	A05
MW-048	CGWMW-048-1044-GW	10/16/18	Grab	GW	Bis(2-ethylhexyl)phthalate	86	µg/L	J	H02,H04
MW-048	CGWMW-048-1044-GW	10/16/18	Grab	GW	Fluorene	0.0059	mg/L	J	H01.H04
MW-048	CGWMW-048-1044-GW	10/16/18	Grab	GW	Naphthalene	0.00056	mg/L	J	H01.H04
MW-048	CGWMW-048-1044-GW	10/16/18	Grab	GW	2-Methylnaphthalene	0.0023	mg/L	J	H01.H04
MW-048	CGWMW-048-1045-QA	10/16/18	Field Duplicate	GW	Fluorene	0.0094	mg/L	J	G01
MW-048	CGWMW-048-1045-QA	10/16/18	Field Duplicate	GW	Naphthalene	0.0019	mg/L	J	G01
MW-048	CGWMW-048-1045-QA	10/16/18	Field Duplicate	GW	2-Methylnaphthalene	0.007	mg/L	J	G01
MW-068	CGWMW-068-1050-GW	10/16/18	Grab	GW	RDX	29	µg/L	J	H01
MW-104	CGWMW-104-1038-GW	10/17/18	Grab	GW	Benzene	0.4	µg/L	UJ	A05
MW-104	CGWMW-104-1038-GW	10/17/18	Grab	GW	Methylene chloride	0.8	µg/L	UJ	A05
MW-105	CGWMW-105-1039-GW	10/17/18	Grab	GW	Benzene	0.4	µg/L	UJ	A05
MW-105	CGWMW-105-1039-GW	10/17/18	Grab	GW	Methylene chloride	0.8	µg/L	UJ	A05
MW-107	CGWMW-107-1041-GW	10/17/18	Grab	GW	Benzene	0.4	µg/L	UJ	A05
MW-107	CGWMW-107-1041-GW	10/17/18	Grab	GW	Methylene chloride	0.8	µg/L	UJ	A05
MW-107	CGWMW-107-1042-QA	10/17/18	Field Duplicate	GW	Benzene	0.4	µg/L	UJ	A05
MW-107	CGWMW-107-1042-QA	10/17/18	Field Duplicate	GW	Methylene chloride	0.8	µg/L	UJ	A05
MW-114	CGWMW-114-1046-GW	10/16/18	Grab	GW	2-Methylnaphthalene	0.000012	mg/L	U	F03
MW-116	CGWMW-116-1049-GW	10/16/18	Grab	GW	Fluorene	0.00002	mg/L	UJ	G02
MW-116	CGWMW-116-1049-GW	10/16/18	Grab	GW	Naphthalene	0.000012	mg/L	UJ	F03,G02
MW-116	CGWMW-116-1049-GW	10/16/18	Grab	GW	2-Methylnaphthalene	0.000012	mg/L	UJ	G02

DNX =Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.
ER = Equipment rinsate.
FD = Field duplicate.
GW = Groundwater.
J = Concentration is an estimated value.
µg/L = Micrograms per liter.
mg/L = Milligrams per liter.
MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.
Qual = Qualifier.
QC = Quality control.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SWB = Source water blank.
SW = Surface water.
TB = Trip blank.

U or UJ = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
A05 = Samples were not preserved properly.
F01 = Sample data were qualified as a result of the method blank.
F03 = Sample data were qualified as a result of the equipment rinsate.
G01 = Surrogate/radiological chemical recovery was above the upper control limit.
G02 = Surrogate/radiological chemical recovery was below the lower control limit.
H01 = MS/MSD recovery was above the upper control limit.
H02 = MS/MSD recovery was below the lower control limit.
H04 = MS/MSD pairs exceed the RPD limit.
M08 = The %D between the two pesticide/PCB column checks was >25%.

3.5.2 Data Quality Summary Report – Fall 2018 Sampling Event

Nine monitoring well samples, along with three field duplicates for various parameters, field QC samples (trip/field/rinsate blanks), and IDW, were collected October 16 and 17, 2018. Results that met QC criteria were produced for all investigation sample analyses performed, with the exceptions noted in the following paragraphs. Each monitoring well was sampled for select target analytes that included VOCs, SVOCs, explosives, and metals (**Table 3-1**).

Sample preparation and analysis holding times were met for all samples with the following exception. Samples CGWMW-SRC-1052-SB, CGWMW-104-1038-GW, CGWMW-105-1039-GW, CGWMW-107-1041-GW, and CGWMW-107-1042-QA were collected in properly preserved vials for volatile analysis; however, the pH was measured greater than 2 by the laboratory and the samples were not analyzed within the 7-day holding time applicable to non-preserved samples. The associated samples were, in turn, qualified as estimated (UJ) for benzene and methylene chloride results.

Naphthalene and 2-methylnaphthalene were detected in an equipment rinsate blank that resulted in 2 methylnaphthalene in sample CGWMW-114-1046-GW and naphthalene in sample CGWMW-116-1049-GW being qualified as undetected (U).

Surrogate recoveries were below the lower control limit for the SVOC analysis of sample CGWMW-116-1049-GW and above the upper control limits for SVOC analysis of field duplicate CGWMW-048-1045-QA. As a result, fluorene, naphthalene, and 2-methylnaphthalene were qualified as estimated (J/UJ) in the affected samples.

Fluorene, naphthalene, and 2-methylnaphthalene results for groundwater sample CGWMW-048-1044-GW were qualified as estimated (J) because of high MS/MSD recovery and elevated MS/MSD RPD results. The bis(2-ethylhexyl)phthalate result for groundwater sample CGWMW-048-1044-GW was qualified as estimated (J) because of a low MS recovery and elevated RPD values. The LCS and MSD recoveries were within control limits. One RDX result for groundwater sample CGWMW-068-1050-GW was qualified as estimated (J) because of a high MS recovery. The sample concentration was noted to be greater than four times the spike concentration. Based on professional judgment, the sample was qualified because an assessment of accuracy was precluded. The LCS and MSD recoveries were within control limits.

A detected, trace concentration of the explosive compound RDX in source water sample CGWMW-SRC-1052-SB was qualified as estimated (J) due to a high percent difference between the primary and confirmation column quantifications.

No results were qualified because of initial or continuing calibration discrepancies, internal standard recoveries, retention times outside of criteria, or LCS recoveries outside of control limits.

Field duplicates were collected for monitoring well and surface water samples. If a given analyte was not detected in both the regular and field duplicate samples, precision was considered acceptable. The RPD was calculated only when both samples were greater than five times the reporting level. When one or both sample values were between the reporting level and five times the reporting level, the absolute difference was evaluated. One naphthalene result, one 2-methylnaphthalene result, and one bis(2-ethylhexyl)phthalate result did not meet field duplicate comparison criteria. As 11 of 14 field duplicate result comparisons met field duplicate comparison criteria, field sampling and analytical precision are considered in control. Because

the field duplicate acceptance criteria provided in the QAPP are intended for general guidance only, field sample results were not qualified based on field duplicate comparisons.

The analytical data for this event are considered to have met data quality objectives, have an established confidence that allows utilization for the project objectives, and provide data for future needs.

4.0 2018 SITE-WIDE MONITORING RESULTS

All target analytes in groundwater are compared to the MCLs. If no MCL is available for a detected analyte, the EPA RSL is used as the screening criterion. Bromacil does not have an MCL or EPA RSL; therefore, the EPA LHA is used as the screening criterion. MCLs, RSLs, and LHAs used as screening criteria are listed in Table G-3 of the CAO (**Appendix C**). If an analyte is not listed in Table G-3 of the CAO (i.e., ethylbenzene, toluene, and xylenes at well STMW-15), the most current MCL or RSL was used as the screening criterion. Per Appendix F (Section II.D) of the 2013 CAO (TDEC, 2013), target analytes detected in boundary wells also are compared to GWPSs (Table G-3 of the CAO, as provided in **Appendix C**).

For surface water, target analytes are screened against the lowest Tennessee water quality criteria, as listed in Table G-3 of the CAO (**Appendix C**).

4.1 GROUNDWATER FLOW DIRECTIONS

Groundwater elevations measured during the spring 2018 sampling event throughout the HSAAP were used to develop a potentiometric map and to evaluate groundwater flow directions. Historical data show that potentiometric elevations tend to decrease in the dry season (e.g., fall sampling event); however, overall groundwater flow directions remain consistent throughout the year. **Figure 4-1** illustrates the spring 2018 potentiometric surface throughout Area B. The map represents the water table elevation within the unconsolidated overburden and the shallow bedrock.

Potentiometric data from 27 wells obtained during spring 2018 were compared to previous information to determine whether flow directions remained consistent with historical patterns (**Appendix A.1**). The 2018 data did not indicate any new or unusually different flow patterns relative to 2005 through 2017, and overall flow directions (e.g., toward the Holston River) were consistent during both sampling events. The difference in water levels between the spring and fall 2018 gauging events ranged between a 0.81- ft increase at well MW-105 to a 9.04-ft decrease at well MW-114 (**Appendix A.1**, **Table A.1-1**).

The general groundwater flow direction in Area B is south toward the Holston River. Slight variations in the overall flow direction to the southeast or southwest are observed depending on the location. However, data collected to date do not indicate any significant permutations in the overall groundwater flow direction. The groundwater gradients and flow directions indicate that the groundwater beneath Area B discharges to the Holston River or to the lower reaches of several drainage ditches that discharge into the Holston River (USACHPPM, 2004b).

4.2 GROUNDWATER

4.2.1 Area A – Solid Waste Management Unit 96

Four boundary wells at Area A – SWMU 96 (MW-104, MW-105, MW-106, and MW-107) were sampled semiannually for CAO-listed target analytes (naphthalene, benzene, and methylene chloride) (**Table 4-1**). Benzene and methylene chloride have not been detected in any of the four monitoring wells since 2008. Naphthalene was not detected in the four monitoring wells sampled in 2018, except for an estimated value of 0.009 µg/L at MW-105 during the fall 2018 event. The most recent detection of naphthalene in these four monitoring wells was in fall 2015 when all detections were at estimated concentrations below the EPA RSL for tap water.

Table 4-1 Target Analyte Concentrations at Area A – SWMU 96 – 2018

Location					Area A - SWMU 96 - 2018									
Well Classification					Boundary		Boundary		Boundary		Boundary			
Station					MW-104	MW-104	MW-105	MW-105	MW-106	MW-106	MW-107	MW-107	MW-107	MW-107
Monitoring Frequency					Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual
Sample Identifier					CGWMW-104-0987-GW	CGWMW-104-1038-GW	CGWMW-105-0988-GW	CGWMW-105-1039-GW	CGWMW-106-0989-GW	CGWMW-106-1040-GW	CGWMW-107-0990-GW	CGWMW-107-0991-QA	CGWMW-107-1041-GW	CGWMW-107-1042-QA
Date Collected					04/01/18	10/17/18	04/01/18	10/17/18	04/01/18	10/17/18	04/01/18	04/01/18	10/17/18	10/17/18
Sample Type					Grab	Grab	Grab	Grab	Grab	Grab	Grab	Field Duplicate	Grab	Field Duplicate
Medium					Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Target Analyte	Unit	GWPS[a]	Screening Criteria (MCL/RSL)[a]	Source										
SVOCs														
Naphthalene	µg/L	238	0.14	RSL	0.012 U	0.012 U	0.0054 U	0.009 J	0.0078 U	0.012 U	0.0061 U	--	0.012 U	--
VOCs														
Benzene	µg/L	8500	5	MCL	0.4 U	0.4 UJ	0.4 U	0.4 UJ	0.4 U	0.4 U	0.4 U	0.4 U	0.4 UJ	0.4 UJ
Methylene chloride	µg/L	8500	5	MCL	0.8 U	0.8 UJ	0.8 U	0.8 UJ	0.8 U	0.8 U	0.8 U	0.8 U	0.8 UJ	0.8 UJ

[a]GWPSs and screening criteria (MCLs and U.S. Environmental Protection Agency RSLs for tap water) for target analytes are provided in Table G-3 of the Corrective Action Order dated January 24, 2013.
-- = Not sampled for this analyte.
GWPS = Groundwater protection standard; used for comparison in boundary wells only.
µg/L = Micrograms per liter.
MCL = Safe drinking water primary maximum contaminant level.
RSL = U.S. Environmental Protection Agency regional screening level.
SVOC = Semi-volatile organic compound.
SWMU = Solid waste management unit.
J = Concentration is an estimated value.
U or UJ = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
VOC = Volatile organic compound.

4.2.2 Area B Landfill Area – SWMUs 19/29

The spring and fall 2018 sampling events included wells MW-48, MW-114, MW-115, and MW-116 in the SWMUs 19/29 vicinity. These wells are located downgradient of SWMUs 19/29. Well MW-48 is located within a localized SVOC source area and has exhibited a high degree of variability in the concentrations and number of SVOC compounds detected over the course of its monitoring history. Monitoring wells MW-114, MW-115, and MW-116 are boundary wells for SWMUs 19/29. The four monitoring wells in the vicinity of SWMUs 19/29 were sampled for CAO-listed target analytes for these SWMUs (arsenic, lead, bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2 methylnaphthalene, naphthalene, and n-nitrosodiphenylamine) (**Table 4-2**).

During the spring 2018 sampling event, bis(2-ethylhexyl)phthalate was detected above the RSL of 6 µg/L in MW-48 (8.2J µg/L). In spring 2018, naphthalene was detected above the RSL of 0.14 µg/L in MW-48 (0.43 µg/L). Duplicate samples for the detections are consistent and slightly lower (**Table 4-2**). Lastly, n-Nitrosodiphenylamine was detected above the RSL of 10 µg/L in MW-48 (14 µg/L); however, the duplicate sample for this analyte showed a value less than the RSL of 10 µg/L (8.4J µg/L). Historically, MW-48 showed non-detects or very low estimated values for nitrosodiphenylamine. In fall 2018, naphthalene was detected at interior source well MW-48 above the RSL of 0.14 µg/L (1.9J µg/L) (**Table 4-2**). The naphthalene detection, while greater than the RSL, was within the range of concentrations from historical sampling events. During the fall 2018 sampling event, bis(2-ethylhexyl)phthalate was detected above the MCL of 6 µg/L (86J µg/L) in MW-48, with a field duplicate significantly lower (7.2J µg/L) but still above the MCL. Dibenzofuran showed detections above the RSL of 5.8 µg/L in both the grab sample and the field duplicate in fall 2018 (6.4J µg/L and 12 µg/L, respectively). Dibenzofuran has not been at this level since spring 2014 (79 µg/L). In fall 2018, none of the other target analytes were detected in well MW-48 above screening criteria. The absorbent sock placed in well MW-48 to passively absorb contaminants was changed during both the spring and fall sampling events.

None of the target analytes were detected in boundary wells MW-114, MW-115, or MW 116 above screening criteria or GWPSs during either LTM sampling event (**Table 4-2**).

During the spring 2018 sampling event, which is sampled on a biennial basis in the spring, none of the target analytes were detected in MW-55 above RSLs.

4.2.3 Area B Landfill Area – SWMU 20

During the spring and fall 2018 sampling events, SWMU 20 boundary well MW-68 was sampled for CAO-listed target analytes arsenic, total chromium, and RDX. In addition, RDX first stage degradation products (DNX, MNX, and TNX) were analyzed at well MW-68 in spring 2018 only (**Table 4-3**).

Arsenic was not detected in well MW-68 during the spring or fall 2018 sampling events (**Table 4-3**). Detections of arsenic at well MW-68 have consistently occurred below the MCL of 10 µg/L since September 2006 and are significantly below the CAO-listed GWPS of 17,000 µg/L.

Total chromium was not detected in well MW-68 during either the spring and fall 2018 sampling events above the MCL of 100 µg/L (**Table 4-3**). In spring 2018, total chromium was detected at a concentration of 0.72J µg/L and, in fall 2018, total chromium was not detected. Detections of total chromium at well MW-68 have consistently occurred below the MCL of 100 µg/L since August 2004 and are significantly below the CAO-listed GWPS of 18,700 µg/L.

These metals data are consistent with RFI findings and previous LTM results and indicate that SWMU 20 does not appear to be a significant source of RCRA metals above risk-based criteria (Bay West and SAIC 2005c, 2006b).

The explosive RDX was detected at well MW-68 in spring 2018 at a concentration of 20 µg/L and in fall 2018 at a concentration of 30 µg/L (**Table 4-3**). Both concentrations exceeded the EPA RSL (0.61 µg/L); however, they did not exceed the GWPS of 1,037 µg/L. Trend analysis demonstrates that the RDX concentrations at well MW-68 exhibit a high degree of event-to-event variability, as shown in **Figure 4-2**. Statistical trend analysis (Mann Kendall U-Test) of the well MW-68 RDX data set indicates no significant trend at either the 80% or 90% confidence level.

Well MW-68, located at the downgradient edge of SWMU 20, was also sampled for primary RDX degradation parameters (DNX, MNX, and TNX) during the spring 2018 sampling event (**Table 4-3**). Two of the three nitroso degradation intermediates of RDX were detected in well MW-68 during the spring 2018 LTM event: MNX at a concentration of 0.59 µg/L, and TNX at a concentration of 0.063J µg/L. The occurrence of these compounds is positive evidence of active anaerobic microbial transformation processes.

As shown on **Figure 4-2**, there appears to be a correlation between measured water levels and RDX concentrations up until June 2009 where higher water levels yield higher RDX concentrations. However, during sampling between June 2009 and June 2015, the trend is less clear. The historical trend appears similar in samples from February 2016 to April 2018.

Table 4-2 Target Analyte Concentrations at Area B Landfill Area – SWMUs 19/29 – 2018

Location					Area B Landfill Area - SWMUs 19/29							
Well Classification					Interior/Source				Boundary		Boundary	
Station					MW-48	MW-48	MW-48	MW-48	MW-114	MW-114	MW-115	MW-115
Monitoring Frequency					Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual	Semiannual
Sample Identifier					CGWMW-048-0993-GW	CGWMW-048-0994-QA	CGWMW-048-1044-GW	CGWMW-048-1045-QA	CGWMW-114-0996-GW	CGWMW-114-1046-GW	CGWMW-115-0998-GW	CGWMW-115-1048-GW
Date Collected					03/31/18	03/31/18	10/16/18	10/16/18	03/31/18	10/16/18	03/31/18	10/16/18
Sample Type					Grab	Field Duplicate	Grab	Field Duplicate	Grab	Grab	Grab	Grab
Medium					Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Target Analyte	Unit	GWPS[a]	Screening Criteria (MCL/RSL)[a]	Source								
Metals												
Arsenic	µg/L	17,000	10	MCL	7	6.9	7.6	8.2	1 U	1 U	1 U	1 U
Chromium, total	µg/L	18,700	100	MCL	--	--	--	--	--	--	--	--
Lead	µg/L	4,250	15	MCL	0.26 J	0.32 J	1.6 J	1.3 J	0.4 J	0.27 J	0.7 U	0.7 U
SVOCs												
2-Methylnapthalene	µg/L	45,900	27	RSL	1.6 J	1.4	2.3 J	7 J	0.012 U	0.012 U	0.012 U	0.012 U
Bis(2-ethylhexyl)phthalate	µg/L	10,200	6	MCL	**8.2 J**	**7.5 J**	**86 J**	**7.2 J**	4.5 U	2.1 U	4.4 U	2 U
Dibenzofuran	µg/L	9,860	5.8	RSL	0.97 U	5.2 J	**6.4 J**	**12**	1 U	1 U	1 U	1 U
Fluorene	µg/L	374,000	220	RSL	4.9	3.8	5.9 J	9.4 J	0.02 U	0.021 U	0.02 U	0.02 U
Naphthalene	µg/L	238	0.14	RSL	**0.43**	**0.32**	**0.56 J**	**1.9 J**	0.0071 U	0.012 U	0.0062 U	0.012 U
n-Nitrosodiphenylamine	µg/L	17,000	10	RSL	**14**	8.4 J	0.99 U	0.97 U	2.1 U	1 U	2 U	1 U

[a]GWPSs and screening criteria (MCLs and U.S. Environmental Protection Agency RSLs for tap water) for target analytes are provided in Table G-3 of the Corrective Action Order dated January 24, 2013.
Bold values indicate detected concentrations that exceed screening criteria; however, no target analytes in boundary wells exceed GWPSs.
GWPS = Groundwater protection standard; used for comparison in boundary wells only.
'-- = Not sampled for this analyte.
J = Concentration is an estimated value.
µg/L = Micrograms per liter.
MCL = Safe drinking water primary maximum contaminant level.
RSL = U.S. Environmental Protection Agency regional screening level.
SVOC = Semi-volatile organic compound.
SWMU = Solid waste management unit.
U = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

Table 4-2 Target Analyte Concentrations at Area B Landfill Area – SWMUs 19/29 – 2018 (continued)

Location					Area B Landfill Area - SWMUs 19/29		
Well Classification					Boundary		Upgradient
Station					MW-116	MW-116	MW-55
Monitoring Frequency					Semiannual	Semiannual	Biennial
Sample Identifier					CGWMW-116-0999-GW	CGWMW-116-1049-GW	CGWMW-055-0995-GW
Date Collected					03/31/18	10/16/18	04/04/18
Sample Type					Grab	Grab	Grab
Medium					Groundwater	Groundwater	Groundwater
Target Analyte	Unit	GWPS[a]	Screening Criteria (MCL/RSL)[a]	Source			
Metals							
Arsenic	µg/L	17,000	10	MCL	0.7 J	1 J	0.67 J
Chromium, total	µg/L	18,700	100	MCL	--	--	1.5 J
Lead	µg/L	4,250	15	MCL	0.78 J	0.44 J	1.1 U
SVOCs							
2-Methylnapthalene	µg/L	45,900	27	RSL	0.012 U	0.012 UJ	0.013 U
Bis(2-ethylhexyl)phthalate	µg/L	10,200	6	MCL	1.7 J	1.9 U	4.6 U
Dibenzofuran	µg/L	9,860	5.8	RSL	0.97 U	0.96 U	1 U
Fluorene	µg/L	374,000	220	RSL	0.02 U	0.02 UJ	0.021 U
Naphthalene	µg/L	238	0.14	RSL	0.0063 U	0.012 UJ	0.0083 J
n-Nitrosodiphenylamine	µg/L	17,000	10	RSL	1.9 U	0.96 U	2.1 U

[a]GWPSs and screening criteria (MCLs and U.S. Environmental Protection Agency RSLs for tap water) for target analytes are provided in Table G-3 of the Corrective Action Order dated January 24, 2013.
Bold values indicate detected concentrations that exceed screening criteria; however, no target analytes in boundary wells exceed GWPSs.
GWPS = Groundwater protection standard; used for comparison in boundary wells only.
J = Concentration is an estimated value.
µg/L = Micrograms per liter.
MCL = Safe drinking water primary maximum contaminant level.
RSL = U.S. Environmental Protection Agency regional screening level.
SVOC = Semi-volatile organic compound.
SWMU = Solid waste management unit.
U = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

Table 4-3 Target Analyte Concentrations at Area B Landfill Area – SWMU 20 – 2018

Location					Area B Landfill Area - SWMU 20-2018			
Well Classification					Boundary	Boundary	Boundary	Boundary
Station					MW-68	MW-68	MW-68	MW-68
Monitoring Frequency					Semiannual[b]	Semiannual[b]	Semiannual[b]	Semiannual[b]
Sample Identifier					CGWMW-068-1000-GW	CGWMW-068-1001-QA	CGWMW-068-1050-GW	CGWMW-068-1051-QA
Date Collected					03/31/18	03/31/18	10/16/18	10/15/18
Sample Type					Grab	Field Duplicate	Grab	Field Duplicate
Medium			Screening Criteria		Groundwater	Groundwater	Groundwater	Groundwater
Target Analyte	Unit	GWPS[a]	(MCL/RSL)[a]	Source				
Metals								
Arsenic	µg/L	17000	10	MCL	1 U	1 U	1 U	1 U
Chromium, total	µg/L	18700	100	MCL	0.72 J	0.72 J	1.8 U	1.8 U
Explosives								
RDX	µg/L	1037	0.61	RSL	**20**	**19**	**29 J**	**30**
Explosive Degradation Intermediaries								
DNX	µg/L	NA	NA	NA	0.1 U	0.1 U	--	--
MNX	µg/L	NA	NA	NA	0.59	0.58	--	--
TNX	µg/L	NA	NA	NA	0.2 U	0.063 J	--	--

[a]GWPSs and screening criteria (MCLs and U.S. EPA RSLs for tap water) for target analytes are provided in Table G-3 of the CAO dated January 24, 2013.
[b]Analysis of degradation intermediates is conducted on an annual basis (spring event only).
[c]Due to a laboratory error, the explosive and explosive degradation intermediates were not analyzed in April 2017; therefore, this well was resampled in May 2017.
Bold values indicate detected concentrations that exceed screening criteria; however, no target analytes in boundary wells exceed GWPSs.
-- = Not sampled for this analyte.
DNX = Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.
GWPS = Groundwater protection standard; used for comparison in boundary wells only.
J = Concentration is an estimated value.
µg/L = Micrograms per liter.
MCL = Safe drinking water primary maximum contaminant level.
MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.
NA = Not applicable; screening criteria (U.S. Environmental Protection Agency RSLs, MCLs, or GWPSs) are not established for this compound.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
RSL = U.S. Environmental Protection Agency regional screening level.
SWMU = Solid waste management unit.
TNX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.
U = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

4.2.4 Area B Production and Shop Area – SWMU 18

One interior/source well (MW-70) at SWMU 18 was sampled in spring 2018 for the CAO-listed target analyte mercury. Mercury was detected in well MW-70 at a concentration of 1.6 µg/L (**Table 4-4**). This result is less than the MCL (2 µg/L) and shows a consistent declining trend in mercury concentrations in MW-70, specifically since April 2010 (**Figure 4-3**). In addition, statistical trend analysis (Mann Kendall U-Test) of the well MW-70 mercury data between 2000 and 2018 indicates a statistically significant declining trend at the 90% confidence level. Generally, historical mercury concentrations are higher when the water level elevation in monitoring well MW-70 is higher (**Figure 4-3**); however, one of the highest water levels was recorded in this monitoring well in May 2015 and is associated with the lowest detection of mercury. This is additional evidence of a declining trend in mercury concentrations.

Table 4-4 Target Analyte Concentrations at Area B Production and Shop Area – SWMU 18 – 2018

Location				Area B Production and Shop Area – SWMU 18	
Well Classification				Interior/Source	
Station				MW-70	MW-70
Monitoring Frequency				Annual	Annual
Sample Identifier				CGWMW-070-1019-GW	CGWMW-070-1020-QA
Date Collected				04/03/18	04/03/18
Sample Type		Screening		Grab	Field Duplicate
Medium		Criteria[a]		Groundwater	Groundwater
Target Analyte	Unit	(MCL/RSL)	Source		
Metals					
Mercury	µg/L	2	MCL	1.6	1.6

[a]The MCL for the target analyte is provided in Table G-3 of the Corrective Action Order (CAO) dated January 24, 2013. Interior/source monitoring wells are not compared to groundwater protection standards from the CAO.
µg/L = Micrograms per liter.
MCL = Safe drinking water primary maximum contaminant level.
RSL = U.S. Environmental Protection Agency regional screening level.
SWMU = Solid waste management unit.

4.2.5 Area B Production and Shop Area – SWMUs 77/78/86/87 and SWMU 88 (Pesticide Areas)

Two interior/source area wells at SWMUs 77/78/86/87 (MW-73 and MW-75) and one interior/source area well at SWMU 88 (MW-86) were sampled in spring 2018 for CAO-listed target analytes dieldrin, alpha- and gamma-chlordane, and bromacil (**Table 4-5**).

Bromacil was detected in well MW-86 at a concentration of 48 µg/L, which is less than the EPA LHA of 70 µg/L. The spring 2018 sampling event represents the ninth consecutive year that the bromacil results in well MW-86 are below screening criteria (**Figure 4-6**). Bromacil was detected in wells MW-73 and MW-75 at concentrations of 0.11J µg/L and 1.1 µg/L, respectively. The spring 2018 sampling event represents the sixth sampling event (2006, 2014, 2015, 2016, 2017, and 2018) that bromacil results in wells MW-73 and MW-75 are below screening criteria.

Total chlordane was detected in well MW-73 at a concentration of 0.204J µg/L (0.13 µg/L alpha chlordane and 0.074 µg/L gamma-chlordane). In well MW-75, total chlordane was detected in the primary sample at a concentration of 0.84J µg/L (0.43J µg/L alpha chlordane and 0.41 µg/L gamma chlordane) and in the field duplicate sample at a concentration of 0.54J µg/L (0.28J µg/L alpha chlordane and 0.26J µg/L gamma-chlordane). The 2018 total chlordane results for these

wells are below the MCL of 2 µg/L; however, the total chlordane detections are elevated relative to previous sampling results prior to 2013 (**Figure 4-5**). Total chlordane was not detected in well MW-86 during the spring 2018 sampling event. This is the eleventh sampling event since 2005 that chlordane was not detected in well MW-86.

For the pesticides and bromacil, there is no clear trend between water level elevation and detected concentrations (**Figure 4-4**, **Figure 4-5**, and **Figure 4-6**).

Table 4-5 Target Analyte Concentrations at Area B Production and Shop Area – SWMUs 77/78/86/87/88 (Pesticide Areas) – 2018

Location				Area B Production and Shop Area – SWMUs 77/78/86/87/88 (Pesticide Areas)			
Well Classification				Interior/Source	Interior/Source		Interior/Source
Station				MW-73	MW-75	MW-75	MW-86
Monitoring Frequency				Annual	Annual	Annual	Annual
Sample Identifier				CGWMW-073-1021-GW	CGWMW-075-1023-GW	CGWMW-075-1024-QA	CGWMW-086-1025-GW
Date Collected				04/03/18	04/03/18	04/03/18	04/03/18
Sample Type				Grab	Grab	Field Duplicate	Grab
Medium				Groundwater	Groundwater	Groundwater	Groundwater
Target Analyte	Unit	Screening Criteria[a] (LHA/ MCL/RSL)	Source				
Pesticides							
Bromacil	µg/L	70	LHA	0.11 J	0.73	1.1	48
Chlordane, alpha-	µg/L	NA	NA	0.13	0.43 J	0.28 J	0.021 U
Chlordane, gamma-	µg/L	NA	NA	0.074	0.41 J	0.26 J	0.021 U
Chlordane, total	µg/L	2	MCL	0.204	0.84 J	0.54 J	0.042 U
Dieldrin	µg/L	0.0015	RSL	**0.42**	**0.12 J**	**0.1 J**	0.021 U

[a]Screening criteria (MCLs, U.S. Environmental Protection Agency RSLs for tap water, and LHAs) for the target analytes are provided in Table G-3 of the Corrective Action Order (CAO) dated January 24, 2013. Interior/source monitoring wells are not compared to groundwater protection standards from the CAO.
Bold values indicate detected concentrations that exceed screening criteria.
J = Concentration is an estimated value.
LHA = Lifetime health advisory.
µg/L = Micrograms per liter.
MCL = Safe drinking water primary maximum contaminant level.
NA = Not applicable; screening criteria (U.S. Environmental Protection Agency RSLs or MCLs) are not established for this compound.
RSL = U.S. Environmental Protection Agency regional screening level.
SWMU = Solid waste management unit.
U or UJ = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

4.2.6 Area B Production and Shop Area – Explosives Production Area

Groundwater well MW-99 within the explosives production area was sampled in spring 2018 for CAO-listed target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) and RDX first-stage degradation products (DNX, MNX, and TNX) (**Table 4-6**). The distribution of current and historical RDX detections in Area B is presented on **Figure 4-7**. RDX was the only target analyte to exceed its RSL of 0.61 µg/L (660 µg/L).

Table 4-6 Target Analyte Concentrations at Area B Production and Shop Area – Explosives Production Area - 2018

Location				Area B Production and Shop Area – Explosives Production Area	
Well Classification				**Interior/Source**	
Station				**MW-99**	**MW-99**
Monitoring Frequency				**Annual**	**Annual**
Sample Identifier				**CGWMW-099-1014-GW**	**CGWMW-099-1015-QA**
Date Collected				**04/04/18**	**04/04/18**
Sample Type				**Grab**	**Field Duplicate**
Medium		**Screening Criteria[a]**		**Groundwater**	**Groundwater**
Target Analyte	**Unit**	**(MCL/RSL)**	**Source**		
Explosives					
2,4,6-Trinitrotoluene	µg/L	2.2	RSL	0.1 U	0.11 U
2,4-Dinitrotoluene	µg/L	0.2	RSL	0.1 U	0.11 U
2,6-Dinitrotoluene	µg/L	15	RSL	0.1 U	0.11 U
2-Amino-4,6-dinitrotoluene	µg/L	30	RSL	0.1 U	0.11 U
4-Amino-2,6-dinitrotoluene	µg/L	30	RSL	0.1 U	0.067 J
Nitroglycerin	µg/L	1.5	RSL	0.75 U	0.82 U
RDX	µg/L	0.61	RSL	**620**	**660**
Explosive Degradation Intermediates					
DNX	µg/L	NA	NA	0.41 J	1.3 J
MNX	µg/L	NA	NA	3.6	3.7
TNX	µg/L	NA	NA	0.29 J	0.42 J

[a]Screening criteria (U.S. Environmental Protection Agency RSLs for tap water) for the target analytes are provided in Table G-3 of the Corrective Action Order (CAO) dated January 24, 2013. Interior/source monitoring wells are not compared to groundwater protection standards from the CAO.

Bold values indicate detected concentrations that exceed screening criteria.
DNX = Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.
J = Concentration is an estimated value.
µg/L = Micrograms per liter.
MCL = Safe drinking water maximum contaminant level.
MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.
NA = Not applicable; screening criteria (U.S. Environmental Protection Agency RSLs or MCLs) are not established for this compound.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
RSL = U.S. Environmental Protection Agency regional screening level.
TNX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.
U = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

During the spring 2018 sampling event, RDX was detected in the field duplicate sample in well MW-99 at a concentration of 660 µg/L (620 µg/L in the associated primary sample), which exceeds the EPA RSL (0.61 µg/L). This is consistent with historical data for the well (**Figure 4-7**). The RDX trend plot for well MW-99 from 2001 to 2018 is presented on **Figure 4-8**. Statistical trend analysis (Mann-Kendall U Test) of the well MW-99 RDX data set currently indicates a decreasing trend at the 90% confidence level. RDX concentrations in well MW-99 have decreased significantly since April 2013, which may be due, in part, to demolition of Building H8 and associated soil excavation. As shown on **Figure 4-8**, there is no clear trend between water level elevation and detected RDX concentrations.

Groundwater monitoring well MW-99 also was sampled for primary RDX degradation parameters (**Table 4-6**) to evaluate biological attenuation of explosives. This well was selected based on historically consistent explosives detections. All three of the nitroso degradation intermediates of RDX were detected in well MW-99 during the 2018 LTM event: DNX at a concentration of 1.3J µg/L, MNX at a concentration of 3.7 µg/L, and TNX at a concentration of 0.42J µg/L. The occurrence of these compounds is positive evidence of active anaerobic microbial transformation processes.

4.2.7 Area B Production and Shop Area – Boundary Wells

The boundary wells monitor both unconsolidated and bedrock stratigraphic intervals downgradient of the explosives production area. Six unconsolidated boundary wells (MW-11, MW-91, MW-101, MW-102, MW-S1A, and STMW-15) located downgradient of the explosives production area and within the Holston River floodplain were sampled in spring 2018. These wells are sampled on an annual basis in the spring. Bedrock boundary wells (GM-12, GM-14, MW 11B, MW-91B, MW-101B, and MW-102B) were also sampled in spring 2018 because they are sampled on a biennial basis in the spring of even-numbered years (i.e., 2016, 2018, 2020).

All unconsolidated boundary wells were sampled for CAO-listed target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) (**Table 4-7**). Additionally, STMW-15 was also analyzed for BTEX (**Table 4-7**).

RDX was not detected in any of the boundary wells sampled. The distribution of current and historical RDX detections in Area B is presented on **Figure 4-7**. No other target analyte explosives were detected in the boundary wells.

No BTEX compounds were detected at well STMW-15, which is located at the active burn area associated with SWMU 50.

Table 4-7 Target Analyte Concentrations at Area B Production and Shop Area – Boundary Wells – 2018

Location					Area B Production and Shop Area – Boundary Wells								
Well Classification					Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary	Boundary
Station					GM-12	GM-14	MW-11	MW-11B	MW-91	MW-91B	MW-101	MW-101	MW-101B
Monitoring Frequency					Biennial	Biennial	Annual	Biennial	Annual	Biennial	Annual	Annual	Biennial
Sample Identifier					CGWMW-G12-1011-GW	CGWMW-G14-1012-GW	CGWMW-011-1002-GW	CGWMW-011B-1003-GW	CGWMW-091-1004-GW	CGWMW-091B-1005-GW	CGWMW-101-1006-GW	CGWMW-101-1007-QA	CGWMW-101B-1008-GW
Date Collected					03/27/18	03/28/18	03/28/18	03/28/18	03/29/18	03/29/18	03/27/18	03/27/18	03/27/18
Sample Type					Grab	Grab	Grab	Grab	Grab	Grab	Grab	Field Duplicate	Grab
Medium					Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Target Analyte	Unit	GWPS[a]	Screening Criteria[a] (MSL/RSL)	Source									
Explosives													
2,4,6-Trinitrotoluene	µg/L	3,740	2.2	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U
2,4-Dinitrotoluene	µg/L	340	0.2	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene	µg/L	25,500	15	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U
2-Amino-4,6-dinitrotoluene	µg/L	51,000	30	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U
4-Amino-2,6-dinitrotoluene	µg/L	51,000	30	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U
Nitroglycerin	µg/L	2,550	1.5	RSL	0.76 U	0.77 U	0.78 U	0.75 U	0.77 U	0.79 U	0.76 U	0.77 U	0.77 U
RDX	µg/L	1,037	0.61	RSL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U
BTEX[b]													
Benzene	µg/L	NA	5	MCL	--	--	--	--	--	--	--	--	--
Ethylbenzene	µg/L	NA	700	MCL	--	--	--	--	--	--	--	--	--
Toluene	µg/L	NA	1,000	MCL	--	--	--	--	--	--	--	--	--
m+p-Xylene	µg/L	NA	10,000	MCL	--	--	--	--	--	--	--	--	--
o-Xylene	µg/L	NA	10,000	MCL	--	--	--	--	--	--	--	--	--
Total Xylenes	µg/L	NA	10,000	MCL	--	--	--	--	--	--	--	--	--

[a]GWP Ss and screening criteria (MCLs and U.S. Environmental Protection Agency RSLs for tap water) for target analytes in boundary wells are provided in Table G-3 of the Corrective Action Order (CAO) dated January 24, 2013.
[b]No screening criteria are provided and no GWPSs were developed for ethylbenzene, toluene, or xylenes in Table G-3 of the CAO dated January 24, 2013. Screening criteria used are the MCLs (December 2017 version).
Bold values indicate detected concentrations that exceed screening criteria.
-- = Not sampled for this analyte.
BTEX = Benzene, toluene, ethylbenzene, and xylenes.
GWPS = Groundwater protection standard.
µg/L = Micrograms per liter.
MCL = Safe drinking water primary maximum contaminant level.
NA = Not applicable; screening criteria (U.S. Environmental Protection Agency RSLs or MCLs) are not established for this compound.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
RSL = U.S. Environmental Protection Agency regional screening level.
U = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

Table 4-7 Target Analyte Concentrations at Area B Production and Shop Area – Boundary Wells – 2018 (continued)

Location					**Area B Production and Shop Area – Boundary Wells**				
Well Classification					**Boundary**	**Boundary**	**Boundary**	**Boundary**	**Boundary**
Station					**MW-102**	**MW-102B**	**MW-S1A**	**STMW-15**	**STMW-15**
Monitoring Frequency					**Annual**	**Biennial**	**Annual**	**Annual**	**Annual**
Sample Identifier					**CGWMW-102-1009-GW**	**CGWMW-102B-1010-GW**	**CGWMW-S1A-1013-GW**	**CGWMW-S15-1017-GW**	**CGWMW-S15-1018-QA**
Date Collected					**03/28/18**	**03/28/18**	**03/28/18**	**03/27/18**	**03/27/18**
Sample Type					**Grab**	**Grab**	**Grab**	**Grab**	**Field Duplicate**
Medium					**Groundwater**	**Groundwater**	**Groundwater**	**Groundwater**	**Groundwater**
Target Analyte	**Unit**	**GWPS[a]**	**Screening Criteria[a] (MSL/RSL)**	**Source**					
Explosives									
2,4,6-Trinitrotoluene	µg/L	3,740	2.2	RSL	0.1 U	0.11 U	0.1 U	0.1 U	--
2,4-Dinitrotoluene	µg/L	340	0.2	RSL	0.1 U	0.11 U	0.1 U	0.1 U	--
2,6-Dinitrotoluene	µg/L	25,500	15	RSL	0.1 U	0.11 U	0.1 U	0.1 U	--
2-Amino-4,6-dinitrotoluene	µg/L	51,000	30	RSL	0.1 U	0.11 U	0.1 U	0.1 U	--
4-Amino-2,6-dinitrotoluene	µg/L	51,000	30	RSL	0.1 U	0.11 U	0.1 U	0.1 U	--
Nitroglycerin	µg/L	2,550	1.5	RSL	0.79 U	0.8 U	0.76 U	0.75 U	--
RDX	µg/L	1,037	0.61	RSL	0.1 U	0.11 U	0.1 U	0.1 U	--
BTEX[b]									
Benzene	µg/L	NA	5	MCL	--	--	--	0.4 U	0.4 U
Ethylbenzene	µg/L	NA	700	MCL	--	--	--	0.4 U	0.4 U
Toluene	µg/L	NA	1,000	MCL	--	--	--	0.4 U	0.4 U
m+p-Xylene	µg/L	NA	10,000	MCL	--	--	--	0.8 U	0.8 U
o-Xylene	µg/L	NA	10,000	MCL	--	--	--	0.4 U	0.4 U
Total Xylenes	µg/L	NA	10,000	MCL	--	--	--	0.8 U	0.8 U

[a]GWP Ss and screening criteria (MCLs and U.S. Environmental Protection Agency RSLs for tap water) for target analytes in boundary wells are provided in Table G-3 of the Corrective Action Order (CAO) dated January 24, 2013.
[b]No screening criteria are provided and no GWPSs were developed for ethylbenzene, toluene, or xylenes in Table G-3 of the CAO dated January 24, 2013. Screening criteria used are the MCLs (December 2017 version).
Bold values indicate detected concentrations that exceed screening criteria.
-- = Not sampled for this analyte.
BTEX = Benzene, toluene, ethylbenzene, and xylenes.
GWPS = Groundwater protection standard.
µg/L = Micrograms per liter.
MCL = Safe drinking water primary maximum contaminant level.
NA = Not applicable; screening criteria (U.S. Environmental Protection Agency RSLs or MCLs) are not established for this compound.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
RSL = U.S. Environmental Protection Agency regional screening level.
U = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

4.3 SURFACE WATER

The spring 2018 sampling event included Holston River surface water sampling at three locations. Per Appendix F (Section III.B) of the CAO that went into effect on January 24, 2013 (TDEC, 2013), surface water samples were analyzed for target analytes, as listed in Table G-3 of the CAO (as provided in **Appendix C**). The CAO-listed target analytes are arsenic; total chromium; lead; mercury; bromacil; alpha- and gamma-chlordane; dieldrin; benzene; methylene chloride; bis(2-ethylhexyl)phthalate; dibenzofuran; fluorene; 2 methylnaphthalene; naphthalene; n nitrosodiphenylamine; 2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2 amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX. Per the CAO, the surface water sample results were reported to TDEC within 45 days of receiving the laboratory reports. The following is a summary of the surface water sampling results, as provided to TDEC on June 12, 2018.

The first surface water sample location (SW-01) is located upstream of HSAAP and the IWTP discharge point. The purpose of the upstream location is to determine if any analyte detected at the sample locations downstream of HSAAP may be attributed to an upstream source (**Figure 4-9**). The second surface water sample location (SW-02) is approximately 2,000 ft downstream of the IWTP discharge location and upgradient of the RDX production area. The final surface water sample location (SW-03) is downstream of Area B and downstream of any potential groundwater discharge from Area B. Note that the grab surface water samples are intended to determine potential impact to surface water from groundwater. These samples are not representative of Holston River surface water. Surface water sample SW-02 is likely too close to the IWTP to allow for proper mixing. The TDEC-required methodology of collecting a mixed cross-sectional surface water sample would be needed to characterize the surface water.

Three metals (arsenic, chromium, and lead), one VOC (methylene chloride), two SVOCs (fluorene and naphthalene), one pesticide (bromacil), and one explosive (RDX) listed as target analytes on Table G-3 of the CAO were detected in surface water samples collected in spring 2018 (**Table 4-8**). Of these detected target analytes, only the RDX detection from one sample location (SW-02) exceeded the lowest water quality criteria listed on Table G-3 of the CAO modification. No other target analytes listed on Table G-3, including mercury and 4-amino-2,6-dinitrotoluene, were detected in the four (three primary samples and one duplicate sample) surface water samples during the spring 2018 sampling event.

Arsenic was detected in surface water sample SW-03 at a concentration of 0.38J µg/L. Arsenic was not detected in surface water samples from SW-01 and SW-02. The arsenic result was qualified as estimated (J) because the detected concentration was below the limit of quantitation (LOQ). The single arsenic detection did not exceed the lowest water quality criterion of 10 µg/L (i.e., EPA MCL) as identified on Table G-3 of the CAO modification.

Total chromium was detected in samples collected from all three surface water sample locations at concentrations of 0.64J µg/L at SW-01, 0.55J µg/L (primary sample) and 0.65J µg/L (duplicate sample) at SW-02, and 0.56J µg/L at SW-03. Total chromium results for all four samples (three primary samples and one duplicate sample) were qualified as estimated (J) because the detected concentrations were below the LOQ. No detections of total chromium exceed the lowest water quality criterion of 11 µg/L (i.e., Tennessee General Water Quality Criteria for Fish and Aquatic Life - Continuous) as identified on Table G-3 of the CAO modification.

Lead was detected in samples collected from all three surface water sample locations at concentrations of 0.34J µg/L at SW-01, 0.65J µg/L (primary sample) and 0.82J µg/L (duplicate sample) at SW-02, and 0.36J µg/L at SW-03. Lead results for all three samples were qualified

as estimated (J) because the detected concentrations were below the LOQ. None of the lead detections exceed the lowest water quality criterion of 2.5 µg/L (i.e., Tennessee General Water Quality Criteria for Fish and Aquatic Life - Continuous) as identified on Table G-3 of the CAO modification.

Methylene chloride was detected in one of three primary surface water samples at a concentration of 0.36J µg/L at SW-02. This methylene chloride result was qualified as estimated (J) because the detected concentration was below the LOQ. Methylene chloride was not detected in the duplicate sample at SW-02. The single detection of methylene chloride did not exceed the lowest water quality criterion of 5 µg/L (EPA MCL), as identified on Table G-3 of the CAO modification.

Fluorene was detected in one of three primary surface water samples at a concentration of 0.029J µg/L at SW-03. The fluorene result was qualified as estimated (J) because the detected concentration was below the LOQ. The fluorene detection did not exceed the lowest water quality criterion of 220 µg/L (i.e., EPA RSL), as identified on Table G-3 of the CAO modification.

Naphthalene was detected in samples collected from all three surface water sample locations at concentrations of 0.0063J µg/L at SW-01, 0.0062J µg/L (primary sample) and 0.0057J µg/L (duplicate sample) at SW-02, and 0.0061J µg/L at SW-03. Naphthalene results for all three samples were qualified as estimated (J) because the detected concentrations were below the LOQ. None of the naphthalene detections exceed the lowest water quality criterion of 0.14 µg/L (EPA RSL), as identified on Table G-3 of the CAO modification.

Bromacil was detected in samples collected from two of three surface water sample locations at concentrations of 3.4J µg/L (primary sample) and 2.5J µg/L (duplicate sample) at SW-02 and 0.34J µg/L at SW-03. Bromacil results were qualified during validation as estimated (J). The difference between detected concentrations reported between the primary and confirmatory gas chromatography columns had a difference of greater than 25% and required manual integration of the baseline by the analyst exceeded the analytical control limits. No bromacil detection exceeded the lowest water quality criterion of 70 µg/L (i.e., EPA LHA), as identified on Table G-3 of the CAO modification.

RDX was not detected in the Holston River at upstream surface water sample location SW-01. Downstream of the IWTP discharge point (surface water sample location SW-02), RDX was detected at a concentration of 2.0J µg/L (primary sample) and 1.7 µg/L (duplicate sample). At the location downstream of HSAAP (SW-03), RDX was detected at a concentration of 0.27 µg/L. The RDX result for SW-02 (primary sample) was qualified as estimated (J) because of low MS recovery and a continuing calibration percent difference outside of acceptance criteria.

The RDX detection at SW-03 was reported at a concentration below the lowest water quality criterion of 0.61 µg/L (EPA RSL) listed in Table G-3 of the CAO modification. Although the RDX concentration at SW-02 slightly exceeded the EPA RSL of 0.61 µg/L, there is no evidence that groundwater discharge from Area B is contributing to the elevated RDX concentrations reported in the Holston River, but rather, they are the result of upstream permitted HSAAP discharges. Further evidence to support this conclusion is that RDX was detected below the lowest water quality criterion (0.61 µg/L) in all boundary wells along the Holston River, except at MW-68 (RDX concentration of 20 µg/L in spring of 2018 and 30 µg/L in the fall of 2018); however, RDX concentrations in MW-68 are below the CAO-listed GWPS (1,037 µg/L). Well MW-68 is located approximately 3.5 miles downstream of surface water location SW-02 and approximately 1 mile upstream of surface water location SW-03. Statistical trend analysis (i.e., Mann Kendall U-Test) of the MW-68 RDX data set indicates no significant trend (increasing or decreasing) at either the 80% or 90% confidence level and that there is no stable trend in concentrations. As statistical

analysis indicates that RDX concentrations in groundwater at MW-68 are not increasing, there is no indication that there will be future impacts to the Holston River because of groundwater discharge near MW-68. No trend analyses have been conducted for the other boundary wells due to the limited number of RDX detections.

Results of the surface water sampling indicate that there is no impact to the Holston River water quality as a result of groundwater discharge. Due to limited data, statistical analysis of surface water concentration trends cannot be conducted until at least 10 sampling events have been conducted; however, a comparison of the fall 2013, spring 2014, fall 2015, spring 2016, fall 2017 and spring 2018 surface water sample results is provided in **Table 4-8**. The next round of surface water sampling will be conducted in the fall of 2019 in accordance with the CAO.

Table 4-8 Target Analyte Concentrations in Surface Water

Location				Upgradient of Area B						Downgradient of Discharge									
Station				SW-01	SW-01	SW-01	SW-01	SW-01	SW-01	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02	SW-02
Monitoring Frequency				Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
Sample Identifier				CSWSW-001-0711-SW	CSWSW-001-0752-SW	CSWSW-001-0841-SW	CSWSW-001-0890-SW	CSWSW-001-0976-GW	CSWSW-001-1026-SW	CSWSW-002-0712-SW	CSWSW-002-0712-QA	CSWSW-002-0753-SW	CSWSW-002-0842-SW	CSWSW-002-0891-SW	CSWSW-002-0893-QA	CSWSW-002-0977-SW	CSWSW-002-0978-QA	CSWSW-002-1027-SW	CSWSW-002-1028-QA
Date Collected				10/24/13	04/14/14	10/06/15	04/28/16	10/19/17	04/02/18	10/24/13	10/24/13	04/14/14	10/06/15	04/28/16	04/28/16	10/19/17	10/19/17	04/02/18	04/02/18
Sample Type				Grab	Grab	Grab	Grab	Grab	Grab	Grab	Field Duplicate	Grab	Grab	Grab	Field Duplicate	Grab	Field Duplicate	Grab	Field Duplicate
Medium				Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Target Analyte	Unit	Lowest Water Quality Criterion[a]	Source of Water Quality Criterion																
Metals																			
Arsenic	µg/L	10	MCL	2.7 J	2.9 U	0.51 J	0.49 J	1.7 U	1 U	2.1 J	--	3.2 U	0.64 J	0.64 J	0.48 J	0.52 U	0.6 U	1 U	1 U
Chromium, total	µg/L	11	TNFAL	**16 J**	0.71 J	0.69 J	1.8 U	1.2 J	0.64 J	**16 J**	--	1 J	0.78 J	1.8 U	1.8 U	1.8 U	1.8 U	0.55 J	0.65 J
Lead	µg/L	2.5	TNFAL	0.3 U	0.37 J	0.48 UJ	0.7 U	0.7 U	0.34 J	0.3 U	--	0.78 J	0.31 UJ	0.21 J	0.7 U	0.7 U	0.7 U	0.65 J	0.82 J
Mercury, elemental	µg/L	0.05	TNRU	0.075 U	0.028 J	0.08 U	0.08 U	0.08 UJ	0.08 U	0.075 U	--	0.033 J	0.08 U	0.08 U	0.08 U	0.08 UJ	0.08 UJ	0.08 U	0.08 U
Pesticides																			
Bromacil	µg/L	70	EPA LHA	0.45 U	1.9 UJ	1 U	1 U	0.066 U	0.06 U	0.48 U	0.45 U	1.9 UJ	1 U	1 U	--	0.059 U	0.062 U	3.4 J	2.5 J
Chlordane, alpha-[b]	µg/L	0.0043	TNFAL	0.038 U	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 U	0.039 U	0.038 U	0.02 U	0.019 U	0.021 U	--	0.019 UJ	0.02 UJ	0.02 UJ	0.02 U
Chlordane, gamma-[b]	µg/L	0.0043	TNFAL	0.038 U	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 U	0.039 U	0.038 U	0.02 U	0.019 U	0.021 U	--	0.019 UJ	0.02 UJ	0.02 UJ	0.02 U
Dieldrin	µg/L	0.00052	TNRU	0.038 U	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 U	0.039 U	0.038 U	0.02 U	0.019 U	0.021 U	--	0.019 UJ	0.02 UJ	0.02 UJ	0.02 U
VOCs																			
Benzene	µg/L	5	MCL	0.2 U	0.2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.2 U	--	0.2 U	0.4 U	0.4 U	--	0.4 U	0.4 U	0.4 U	0.4 U
Methylene chloride	µg/L	5	MCL	0.3 UJ	0.8 UJ	0.8 U	0.8 U	0.8 U	0.8 U	0.3 UJ	--	0.8 UJ	0.8 U	0.8 U	--	0.8 U	0.8 U	0.36 J	0.8 U
SVOCs																			
2-Methylnaphthalene	µg/L	27	RSL	0.031 U	0.0096 U	0.013 U	0.012 U	0.012 U	0.012 U	0.029 U	--	0.0098 U	0.012 U	0.012 U	0.013 U	0.012 U	0.012 U	0.012 U	0.012 U
Bis(2-ethylhexyl)phthalate	µg/L	6	MCL	2 U	0.97 U	2 U	1.9 U	4.3 U	4.4 U	2 U	--	1 U	2 U	2.2 U	--	4.3 U	4.4 U	4.4 U	4.3 U
Dibenzofuran	µg/L	5.8	RSL	0.15 U	0.97 U	1 U	0.97 U	0.99 U	0.99 U	0.15 U	--	1 U	0.98 U	1.1 U	--	0.98 U	0.99 U	0.99 U	0.99 U
Fluorene	µg/L	220	RSL	0.051 U	0.019 U	0.021 U	0.02 U	0.02 U	0.02 U	0.049 U	--	0.02 U	0.019 U	0.019 U	0.021 U	0.021 U	0.019 U	0.02 U	0.02 U
Naphthalene	µg/L	0.14	RSL	0.041 U	0.0096 U	0.013 U	0.012 U	0.012 U	0.0063 J	0.039 U	--	0.0098 U	0.012 U	0.012 U	0.013 U	0.012 U	0.0071 J	0.0062 J	0.0057 J
N-Nitrosodiphenylamine	µg/L	10	RSL	0.26 U	0.97 U	1 U	0.97 U	2 U	2 U	0.25 U	--	1 U	0.98 U	1.1 U	--	2 U	2 U	2 U	2 U
Explosives																			
2,4,6-Trinitrotoluene	µg/L	2.2	RSL	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.11 U	--	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dinitrotoluene	µg/L	0.2	RSL	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U	0.1UJ	0.11 U	--	0.1 U	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene	µg/L	15	RSL	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U	0.1UJ	0.11 U	--	0.1 U	0.1 U	0.1 U	0.1 U
2-Amino-4,6-dinitrotoluene	µg/L	30	RSL	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.11 U	--	0.1 U	0.1 U	0.1 U	0.1 U
4-Amino-2,6-dinitrotoluene	µg/L	30	RSL	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.17	0.1 UJ	0.093 J	--	0.89	1.1	0.1 U	0.1 U
Nitroglycerin	µg/L	1.5	RSL	0.52 U	0.52 U	0.77 UJ	0.77 U	0.76 U	0.79 U	0.52 U	0.51 U	0.51 U	0.77 UJ	0.82 U	--	0.75 U	0.76 U	0.75 U	0.76 U
RDX	µg/L	0.61	RSL	0.052 U	0.052 UJ	0.1 UJ	0.1 U	0.1 U	0.11 U	**87**	**110**	**300**	**47 J**	**0.93**	**--**	**99 J**	**120**	**2 J**	**1.7**

[a]The lowest water quality criterion comes from Table G-3 of the CAO dated January 24, 2013.
[b]The lowest water quality criterion listed for alpha- and gamma-chlordane is for total chlordane.
Bold values indicate detected concentrations that exceed the lowest water quality criterion.
-- = Not sampled for this analyte.
EPA = U.S. Environmental Protection Agency.
J = Concentration is an estimated value.
LHA = Lifetime health advisory.
µg/L = Micrograms per liter.
MCL = Safe drinking water primary maximum contaminant level.
TNFAL = TN - Fish and Aquatic Life – Continuous.
TNRU = TN – Recreational Uses – Water and Organism.
TN = Tennessee General Water Quality Criteria (TDEC, 2011).
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
RSL = EPA regional screening level.
SVOC = Semi-volatile organic compound.
U or UJ = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
VOC = Volatile organic compound.

Table 4-8 Target Analyte Concentrations in Surface Water (continued)

Location				Downgradient of Area B						
Station				SW-03	SW-03	SW-03	SW-03	SW-03	SW-03	SW-03
Monitoring Frequency				Annual	Annual	Annual	Annual	Annual	Annual	Annual
Sample Identifier				CSWSW-003-0713-SW	CSWSW-003-0754-SW	CSWSW-003-0843-SW	CSWSW-003-0844-QA	CSWSW-003-0892-SW	CSWSW-003-0979-SW	CSWSW-003-1029-SW
Date Collected				10/24/13	04/14/14	10/06/15	10/06/15	04/28/16	10/19/17	04/02/18
Sample Type				Grab	Grab	Grab	Field Duplicate	Grab	Grab	Grab
Medium				Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Target Analyte	Unit	Lowest Water Quality Criterion[a]	Source of Water Quality Criterion							
Metals										
Arsenic	µg/L	10	MCL	3.1 J	3 U	0.89 J	0.98 J	0.78 J	1.5 U	0.38 J
Chromium, total	µg/L	11	TNFAL	**16 J**	1 J	1.6 J	1.5 J	1.81 U	0.7 J	0.56 J
Lead	µg/L	2.5	TNFAL	0.3 U	0.57 J	0.25 J	0.27 J	0.70 U	0.7 U	0.36 J
Mercury, elemental	µg/L	0.05	TNRU	0.075 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 UJ	0.08 U
Pesticides										
Bromacil	µg/L	70	EPA LHA	0.45 U	0.68 J	1 U	1 U	1 U	0.059 U	0.34 J
Chlordane, alpha-[b]	µg/L	0.0043	TNFAL	0.038 U	0.019 U	0.019 U	0.021 U	0.023 U	0.02 UJ	0.02 U
Chlordane, gamma-[b]	µg/L	0.0043	TNFAL	0.038 U	0.019 U	0.019 U	0.021 U	0.023 U	0.02 UJ	0.02 U
Dieldrin	µg/L	0.00052	TNRU	0.038 U	0.019 U	0.019 U	0.021 U	0.023 U	0.02 UJ	0.02 U
VOCs										
Benzene	µg/L	5	MCL	0.2 U	0.2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Methylene chloride	µg/L	5	MCL	0.3 UJ	0.8 UJ	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
SVOCs										
2-Methylnaphthalene	µg/L	27	RSL	0.029 U	0.01 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U
Bis(2-ethylhexyl)phthalate	µg/L	6	MCL	1.9 U	0.99 U	2.1 U	2.1 U	2.1 U	4.3 U	4.3 U
Dibenzofuran	µg/L	5.8	RSL	0.15 U	0.99 U	1 U	1 U	1 U	0.98 U	0.98 U
Fluorene	µg/L	220	RSL	0.049 U	0.02 U	0.02 U	0.019 U	0.021 U	0.019 U	0.029 J
Naphthalene	µg/L	0.14	RSL	0.039 U	0.01 U	0.012 U	0.012 U	0.012 U	0.012 U	0.0061 J
N-Nitrosodiphenylamine	µg/L	10	RSL	0.24 U	0.99 U	1 U	1 U	1 U	2 U	2 U
Explosives										
2,4,6-Trinitrotoluene	µg/L	2.2	RSL	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U	0.1 U	0.1 U
2,4-Dinitrotoluene	µg/L	0.2	RSL	0.1 U	0.1 U	0.1UJ	0.1UJ	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene	µg/L	15	RSL	0.1 U	0.1 U	0.1UJ	0.1UJ	0.1 U	0.1 U	0.1 U
2-Amino-4,6-dinitrotoluene	µg/L	30	RSL	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U	0.1 U	0.1 U
4-Amino-2,6-dinitrotoluene	µg/L	30	RSL	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U	0.1 U	0.1 U
Nitroglycerin	µg/L	1.5	RSL	0.52 U	0.52 U	0.75 UJ	0.76 UJ	0.78 U	0.77 U	0.77 U
RDX	µg/L	0.61	RSL	**2.4**	**15**	**3.4 J**	**3.1 J**	**0.73**	**3**	0.27

[a]The lowest water quality criterion comes from Table G-3 of the Corrective Action Order dated January 24, 2013.
[b]The lowest water quality criterion listed for alpha- and gamma-chlordane is for total chlordane.
Bold values indicate detected concentrations that exceed the lowest water quality criterion.
-- = Not sampled for this analyte.
EPA = U.S. Environmental Protection Agency.
J = Concentration is an estimated value.
LHA = Lifetime health advisory.
µg/L = Micrograms per liter.
MCL = Safe drinking water primary maximum contaminant level.
TNFAL = TN - Fish and Aquatic Life – Continuous.
TNRU = TN – Recreational Uses – Water and Organism.
TN = Tennessee General Water Quality Criteria (TDEC, 2011).
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
RSL = EPA regional screening level.
SVOC = Semi-volatile organic compound.
U or UJ = The analyte was not detected and was reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.
VOC = Volatile organic compound.

4.4 CONCLUSIONS FOR 2018 LONG-TERM MONITORING

The following is a summary of the 2018 LTM sampling events:

- Area A – SWMU 96: Four boundary wells at Area A – SWMU 96 (MW-104, MW-105, MW-106, and MW-107) were sampled in spring and fall 2018 for CAO-listed target analytes benzene, methylene chloride, and naphthalene. The following is a summary of those results:
    - None of the target analytes were detected in Area A – SWMU 96 boundary monitoring wells during either the spring or fall 2018 LTM events, except naphthalene in MW-105 during the fall 2018 sampling event at an estimated concentration (0.009J micrograms per liter - µg/L). The target analyte naphthalene has not been detected in these wells for five sampling events. Benzene and methylene chloride have not been detected in these wells in the past ten years.
- Area B Landfill Area – SWMUs 19/29: Interior source area monitoring well MW-48 and boundary monitoring wells MW-114, MW-115, and MW-116 were sampled for CAO-listed target analytes (arsenic, lead, bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, naphthalene, and n-nitrosodiphenylamine) during both the spring and fall 2018 sampling events. The following is a summary of those results:
    - During the spring 2018 sampling event, target analyte naphthalene was detected at interior source area monitoring well MW-48 (0.43 µg/L) above screening criteria (0.14 µg/L). Naphthalene was also detected above screening criteria in fall 2018 (1.9J µg/L) at MW-48. Nitrosodiphenylamine was detected in MW-48 above the RSL (14 µg/L) in spring 2018. Bis(2-ethylhexyl)phthalate was detected above the RSL in both spring and fall 2018 (8.2J µg/L and 86J µg/L, respectively). No other target analytes were detected above criteria in the interior source area monitoring well.
    - No target analytes were detected in boundary wells MW-114, MW-115, and MW-116 above screening criteria (MCLs or RSLs) or GWPSs during either LTM sampling event.
    - No target analytes were detected in MW-55 above RSLs during the spring 2018 event, which is sampled on a biennial basis in the spring.
- Area B Landfill Area – SWMU 20: Boundary monitoring well MW-68 was sampled for CAO-listed target analytes (arsenic, total chromium, and RDX) during both the spring and fall 2018 sampling events. In addition, well MW-68 was sampled for RDX degradation parameters (DNX, MNX, and TNX) during the spring 2018 sampling event. The following is a summary of those results:
    - Target analytes arsenic and total chromium were not detected in well MW-68 above screening criteria or GWPSs. Neither of these metals has been detected above screening criteria for ten events.
    - The explosive RDX was detected at well MW-68 in spring 2018 at a concentration of 20 µg/L and in fall 2018 at a concentration of 30 µg/L (**Table 4-3**). Both concentrations exceeded the EPA RSL (0.61 µg/L); however, they did not exceed the GWPS of 1,037 µg/L. Trend analysis demonstrates that the RDX concentrations at well MW-68 exhibit a high degree of event-to-event variability, as shown on **Figure 4-2**. Statistical trend analysis (Mann-Kendall U-Test) of the well MW-68 RDX data set indicates no significant trend at either the 80% or 90% confidence level.

- Primary RDX degradation parameters (DNX, MNX, and TNX) were also collected during the spring 2018 sampling event (**Table 4-3**). Two of the three nitroso degradation intermediates of RDX were detected in well MW-68 during the spring 2018 LTM event: MNX at a concentration of 0.59 µg/L, and TNX at a concentration of 0.063J µg/L. The occurrence of these compounds is positive evidence of active anaerobic microbial transformation processes.

- Area B Production and Shop Area – SWMU 18: One interior/source well (MW-70) at SWMU 18 was sampled in spring 2018 for the CAO-listed target analyte mercury. The following is a summary of those results:
  - Mercury was detected at 1.6 µg/L, which is below the MCL. Statistical trend analysis (Mann Kendall U-Test) of the well MW-70 mercury data between 2000 and 2018 indicates a statistically significant declining trend at the 90% confidence level.

- Area B Production and Shop Area – SWMUs 77/78/86/87 and SWMU 88 (Pesticide Areas): Two interior/source area wells at SWMUs 77/78/86/87 (MW-73 and MW-75) and one interior/source area well at SWMU 88 (MW-86) were sampled in spring 2018 for CAO-listed target analytes dieldrin, alpha- and gamma-chlordane, and bromacil. The following is a summary of those results:
  - Dieldrin was detected above its EPA RSL (0.0015 µg/L) at well MW-73 at a concentration of 0.42 µg/L and at well MW-75 at a concentration of 0.12J µg/L. Dieldrin was not detected in well MW-86 during the spring 2018 sampling event. This is the eleventh sampling event that dieldrin was not detected in well MW-86.
  - Total chlordane was detected at well MW-73 at a concentration of 0.204 µg/L and at well MW-75 at a concentration of 0.84J µg/L. The 2018 total chlordane results for these wells are below the MCL of 2 µg/L. Total chlordane was not detected in well MW-86 during the spring 2018 sampling event. This is the eleventh sampling event that total chlordane was not detected in well MW-86.
  - Bromacil was detected in well MW-86 at a concentration of 48 µg/L, which is less than the EPA LHA of 70 µg/L. The spring 2018 sampling event represents the ninth year that the bromacil results in well MW-86 are below screening criteria. In spring 2018, bromacil was not detected in wells MW-73 or MW-75 above criteria. This is the sixth sampling event (2006, 2014, 2015, 2016, 2017, and 2018) that bromacil was not detected above criteria in wells MW-73 and MW-75.

- Area B Production and Shop Area – Explosives Production Area: Groundwater well MW-99 within the explosives production area was sampled in spring 2018 for CAO-listed target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) and RDX first-stage degradation products (TNX, DNX, and MNX). The following is a summary of those results:
  - RDX was detected in the field duplicate sample at a concentration of 660 µg/L (620 µg/L in the associated primary sample), which exceeds the EPA RSL (0.61 µg/L). This is consistent with historical data for the well. Statistical trend analysis (Mann-Kendall U-Test) of the well MW-99 RDX data set currently indicates a decreasing trend at the 90% confidence level. Concentrations of RDX in well MW-99 have been decreasing since April 2008, which may be due, in part, to demolition of Building H8 and associated soil excavation.

  - With the exception of RDX, none of the CAO-listed target analyte explosives were detected above criteria.
  - All three of the nitroso degradation intermediates of RDX (DNX, MNX, and TNX) were detected in well MW-99 during the spring 2018 LTM event. The occurrence of these compounds is positive evidence of active anaerobic microbial transformation processes.

- Area B Production and Shop Area – Boundary Wells: All unconsolidated boundary wells (MW-11, MW-91, MW-101, MW-102, MW-S1A, and STMW-15) were sampled for CAO-listed target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) during the spring 2018 sampling event. Bedrock boundary wells (GM-12, GM-14, MW-11B, MW-91B, MW-101B, and MW-102B) were also sampled in spring 2018 because they are sampled on a biennial basis in the spring of even-numbered years (i.e., 2016, 2018, 2020). In addition, one boundary monitoring well downgradient of SWMU 50 (STMW-15) was also sampled for BTEX. The following is a summary of those results:
  - RDX was not detected in any of the boundary wells sampled. The distribution of current and historical RDX detections in Area B is presented in **Figure 4-7**. No other target analyte explosives were detected in the boundary wells.
  - No BTEX compounds were detected in well STMW-15 located at the active burn area associated with SWMU 50.
- Holston River Surface Water: Surface water samples were analyzed for all CAO-listed target analytes (arsenic; total chromium; lead; mercury; dieldrin; alpha- and gamma-chlordane; bromacil; benzene; methylene chloride; bis[2-ethylhexyl]phthalate; dibenzofuran; fluorene; 2-methylnaphthalene; naphthalene; n-nitrosodiphenylamine; 2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) during the spring 2018 sampling event. The following is a summary of the 2018 LTM results:
  - RDX was not detected in the Holston River at upgradient surface water sample location SW-01. Downgradient of the IWTP discharge point (surface water sample location SW-02), RDX was detected at a concentration of 2.0J µg/L (1.7 µg/L in the associated field duplicate sample). At the location downgradient of HSAAP (SW-03), RDX was detected at a concentration of 0.27 µg/L. While the RDX concentration at SW-02 exceeded the lowest water quality criterion of 0.61 µg/L (the EPA RSL), there is no evidence that groundwater discharge from Area B is contributing to the elevated RDX concentrations reported in the Holston River, but rather, they are the result of upstream permitted HSAAP discharges. Note that the grab surface water samples are intended to determine potential impact to surface water from groundwater. These samples are not representative of Holston River surface water. Surface water sample SW-02 is likely too close to the IWTP to allow for proper mixing. The TDEC-required methodology of collecting a mixed cross-sectional surface water sample would be needed to characterize the surface water.
  - No other target analytes were detected in surface water above screening criteria.
  - Results of the surface water sampling indicate that there is no impact to the Holston River water quality as a result of groundwater discharge.
  - Due to limited data, statistical analysis of surface water concentration trends cannot be conducted until at least 10 sampling events have been conducted; however, a comparison

of the fall 2013, spring 2014, fall 2015, spring 2016, fall 2017, and spring 2018 surface water sample results is provided in **Table 4-8**.

5.0 2018 LONG-TERM OPERATIONS

5.1 LANDFILL CAP INSPECTIONS

The following landfills/coal tar sites (**Figure 5-1**) were inspected by Bay West during the spring and fall (March/April and October) of 2018 as part of the calendar year 2018 LTO activities at HSAAP:

- SWMU 4, Coal Tar Tanks Behind Building 8 (**Figure 5-2**), is the location of two aboveground coal tar tanks that stored coal tar for use as supplemental fuel in the Area A Building 8 boilers. The tanks and contaminated soil were removed in 1996. The contaminated soil and coal tar could not be completely removed due to adjacent buildings/structures and underground utilities.
- SWMU 14, Coal Tar Landfill 1 (**Figure 5-3**), was used to dispose of coal tar generated from the coal gasification plant and fly ash/cinders generated in the Area A and Area B boilers. The approximately 3-acre unit was closed in 1983, when it was capped with 2 ft of clay and a vegetative cover. Riprap was placed along the slope on the river side to control erosion.
- SWMU 18, Closed Sanitary Landfill (**Figure 5-4**), was used to dispose of empty pesticide containers, asbestos wastes, fluorescent tubes, laboratory breakage (glass), light bulbs, cafeteria waste, oils, and cleaning agents. Wastes were disposed of by the trench method. The approximately 7-acre unit is capped with 2 ft of clay and is grass covered. TDEC acknowledged closure of the unit in May 1986.
- SWMUs 19/29, Construction Debris Landfill and Former Sedimentation Pond (**Figure 5-5**), comprises approximately two acres. SWMU 29 was the stormwater runoff sedimentation pond for the sanitary landfill (SWMU 17). SWMU 19, which was used for the disposal of uncontaminated construction debris, was built on top of SWMU 29. SWMU 19 was capped with clay and a vegetative cover.
- SWMU 20, Rock Quarry Landfill (**Figure 5-6**), was used for the disposal of demolition debris in the 1940s. This unit, an approximately 5-acre former rock quarry, was reportedly filled with 30 to 50 ft of waste material and capped with a 2-ft layer of clay and a vegetative cover. The unit was closed in 1983.
- SWMU 26, WWII Coal Tar Site (**Figure 5-7**), an approximately six-acre unit, was used to dispose of approximately 175 cubic yards (yd^3) of coal tar during WWII. Coal tar was dumped down the railroad embankment and covered with clay and railroad ballast.
- SWMU 96, Producer Gas Building and Coal Tar Liquor Storage Tanks (**Figure 5-8**), was part of the Area A coal gas production area. The unit was closed in 1997. The Decanters and the Exhauster Building were demolished in 2004. Contaminated soil and coal tar were excavated at that time; however, all the material could not be removed due to the adjacent structures. The area was backfilled and a clay cap was installed.
- SWMU 103, Coal Tar Site and Ditch at Gas Producer Building (**Figure 5-9**), is located along the north bank of the south fork of the Holston River. It consists of a ditch that originally extended from the rear of Building 8 to the river. There is no visual evidence of the ditch except for a culvert pipe located at the top of the riverbank. Coal tar was removed from the riverbank area in 2005. Two small areas of dense, inert coal tar remain on the slope because it was impractical to remove the material. This area is inspected for the presence of coal tar only.

The inspections included land use control (LUC) inspections. The LUC inspections are performed to monitor the effectiveness of HSAAP's Land Use Control Implementation Plan (LUCIP). The LUC inspections consisted of a visual examination of each area for signs of soil disturbance to assess if unauthorized excavation has taken place and verify that the soil caps remain intact. Bay West completed LUCIP inspections during the spring and fall field events at the following sites:

- SWMUs 77/78/86/87, Pesticide Areas near Building 148 (**Figure 5-10**);
- SWMU 88, WWII Pesticide Wash-Down Area (**Figure 5-11**);
- SWMU 109, WWII Coal Tar Site 2 (**Figure 5-12**); and
- SWMU 3, Catch Basins and Aprons (**Figure 5-13**).

HSAAP independently completed landfill inspections at the following ten sites in the spring and/or fall of 2018:

- SWMU 21—Rock Dam Landfill
- SWMU 23—Former Fly Ash Landfill
- SWMU 24—Building 200 Coal Tar and Fly Ash Landfill;
- SWMU 25—Area B Tar Burial Site;
- SWMU 27—Sedimentation Pond for Coal Pile;
- SWMU 37—Nitric Acid Spill Pond;
- SWMU 44—Former Burning Pads;
- SWMU 47—Burning Piles;
- SWMU 56—Existing Coal Pile; and
- AOC-N—Hydraulic Fluid Leak, G-2 Pump House at Building 404.

5.1.1 Landfill Cap Inspection Findings

All inspections included examining the caps for signs of settlement, sagging, fissures, erosion channels/gullies, and other damage. The vegetative covers were inspected for signs of deterioration or dead areas. Drainage controls, such as ditches, culverts, and outfall structures, where present, were examined to ensure that they were intact and functioning. Fences, gates, and other structures were inspected for signs of damage. Signs were checked for visibility and legibility. The coal tar areas (SWMUs 4, 14, 26, 96, 103, and 109) were inspected for signs of surficial coal tar seepage. Prior to the fall 2018 inspections, all SWMU areas except for the SWMU 3 buildings, which had previously been demolished, had been mowed to facilitate the inspection process. The inspection findings were documented on the Landfill Cap/Cover Inspection Report Form. The inspection reports are contained in **Appendices D.1** and **D.2**. The Bay West inspection findings are summarized as follows:

- SWMU 3—The signs at the buildings and entrance to the explosives production area were in good repair, accurate, and legible during both inspection events and were depicted in the correct locations, as indicated on the figure (**Figure 5-13**). For all the buildings with the exceptions listed below, signs of unauthorized activities, excavations, or disturbance to the gravel caps were not observed during either inspection event. The gravel cover did not show signs of settlement or erosion. The following issues were noted during the 2018 inspections:
    - During the fall inspection event, the SWMU sign adjacent to Building B3 was damaged. The top left bolt had come loose from the sign and was no longer securing the sign to the sign posts. The sign will be repaired during the spring 2019 inspection event.

- During the spring and fall inspection events, what appeared to be exposed soil was observed between the two sections of above-ground concrete piping containments north of Building D1. Another small patch of exposed soil was observed just south of the above-ground piping lines near the NE corner of the building apron. HSAAP personnel indicated that no construction had taken place.
- Minor settlement was observed at Building D8 and E4 during both inspection events. This settlement appeared to be historical and naturally occurring; no action was required to address this.
- Minor erosion was observed at Building D5 during the spring and fall inspection events. This erosion appeared to be natural and was not interfering with the current catch basins or aprons; no action was required to address this.
- During the fall inspection event, a new concrete pad with a grate cover appeared to have been installed south of the southeastern catch basin at Building D10. The concrete appeared to be a different color than surrounding concrete and new gravel was present surrounding the concrete pad. No exposed soil was visible surrounding the catch basins/aprons.
- During the spring and fall inspection events, there appeared to be exposed soil/minimal gravel cover around a new power pole near the W-NW apron near Building E3. HSAAP personnel indicated that no construction had taken place.
- During the spring inspection, Building G8 was under construction. Surrounding catch basins and aprons appeared to have been disturbed and/or replaced during construction activities, and soils around the building footprint were disturbed for the installation of new building supports. Construction was not evident during the fall inspection event. A SWMU sign had not been installed at this building yet, during either the spring or fall inspection event. HSAAP environmental personnel confirmed that the work at this building was authorized and that all required notifications were conducted prior to initiating the work.
- New concrete support columns for the new steam line were observed during the fall inspection event adjacent to Building E10. The support columns had been installed along the southern side of the building.
- Demolished Buildings H1, H2, H3, H8, H9, and H10: During the fall inspection event, these areas had not been mowed to facilitate the inspection; therefore, it was difficult to inspect the ground cover. No major evidence of disturbance or unauthorized activities were noted in either inspection.
    - At Building H3, an area of bare/exposed soil was observed during both inspection events, north of the catwalk south of the former building footprint within an area with RDX detections above industrial and residential RSLs.
    - During the spring inspection event at Building H8, a large linear rutted area seemed disturbed and appeared to have been restored and covered with straw. This is likely a result of activities related to the installation of new above-ground steam lines installed in the vicinity of the former building footprint. During the fall inspection event, an area south of the installed SWMU 3 sign was bare of vegetation. It appeared to have originated from the installation of the concrete pillars for the new steam lines although no steam lines are present within this area. The SWMU sign appeared to have

been struck; the sign was loose, and one side of the sign was slightly more elevated than the other.

- During the spring inspection, areas within the footprints of the former buildings for Buildings H9 and H10 appeared to have been disturbed and restored and covered with straw. In addition, an area east of the former building footprint for Building H9 was a storage area for ongoing steam line installation activities: gravel was stockpiled adjacent to the former building footprint and other materials were being stored nearby. During the fall inspection event, areas within the footprints of the former buildings were bare of vegetation. Support columns for the new above-ground steam lines had been installed adjacent to the road, which is north of the former building footprints.

- A SWMU sign was not observed to be present at Building I3 during either inspection event.
- Disturbed/exposed soils were observed around a utility shut-off valve near the western side of Building L1 during the fall inspection event.
- During the fall inspection event, Ms. Peters informed Bay West personnel of explosives on the ground near the scrubber at Building L8; it was advised that personnel not walk around the building during the inspection. The inspection was completed from the road; there appeared to be fresh gravel along the eastern side of the building. No obvious signs of disturbance were visible.
- During the spring inspection event, exposed soils were observed at Building N4 beneath a stairway leading to the building. This was initially noted in the fall 2016 inspection event. It appears new supports for the stairway had been installed, causing the displaced soils to be exposed. HSAAP personnel indicated that no construction had taken place. This building was unable to be accessed during the times of the fall inspections. The building was barricaded off, restricting access during the entirety of the fall inspection event.
- During the spring and fall inspection events, the sign located at Building N5 was partially obstructed by a dumpster. In addition, minor erosion and exposed soils were observed around the northern catch basin.

- SWMU 4—The sign was in good repair, accurate, and legible during both inspection events. There are no gates or fences associated with this SWMU. Small pieces of coal tar (ranging from 0.5 to 5 centimeters [cm] in diameter) were observed at the surface along the north and east portions of the SWMU. Coal tar was also observed to be encrusted on the south side of Building 8 during both inspection events; this material has been observed previously and does not require action/removal. In past inspection events, an area along the northern portion of the SWMU appeared disturbed/rutted. Bay West field staff attempted to smooth out the rutted area with hand tools during the spring 2016 inspection; the remaining rutting is minor and does not require further action. Vegetation was observed to be growing through the gravel cap within the northern portions of the SWMU. The LUCIP inspections at SWMU 4 did not indicate any evidence of unauthorized cap disturbance or excavation during either inspection.
- SWMU 14—The sign was in good repair, accurate, and legible during both inspection events. The grass covering the area was approximately 6 to 12 inches (in.) high during the spring inspection and 18 to 24 in. during the fall inspection. Areas of bare or stressed vegetation were not observed during either inspection event with the exception of the area

where coal tar was removed in fall 2017. The area where the clay cap was repaired following coal tar removal in the fall of 2017 remained bare in spring 2018 and required seeding. In the fall inspection event, 4-5-foot-tall vegetation was present within the western portion of the SWMU in the area surrounding where coal tar was removed in 2017, making the area difficult to inspect for the presence of coal tar or to inspect the area for vegetation growth. The fence and gate were in acceptable condition. No erosion, excavation, or unauthorized activities were observed during either inspection. During both inspections, metal pipes were observed to be partially buried near the southwest extent of the SWMU area; these metal pipes had been observed previously for several years and do not require action/removal. HSAAP personnel were informed of the presence of the pipes, and they do not affect mowing activities. Trees were observed just behind the SWMU sign during both inspections: one 4-in. diameter tree branching into two trunks and one trunk branching into 5+ trunks 3 in. in diameter. HSAAP personnel were informed of the presence of the trees; they do not require action. During the spring 2018 event, small pieces of coal tar were observed scattered on the surface of the SWMU in an area directly adjacent to where the large buried mass of coal tar was removed from the western edge of the SWMU in the fall of 2017. In addition, a few larger pieces of coal tar were observed on the surface of the SWMU along the sloped area near the western edge of the SWMU. Evidence of coal tar (visual or olfactory) was not observed during the fall 2018 inspection. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation.

- SWMU 18—The sign was in good repair, accurate, and legible during both inspection events. The grass was approximately 6 to 18 in. high during either inspection; areas of bare or stressed vegetation were not observed during either inspection event. There are no gates or fences associated with this SWMU. No erosion or unauthorized activities were observed during either inspection. Concrete debris was observed along the western sloped edges of the SWMU during both inspection events. Some localized settlement was observed near the central portion of the SWMU, as well as the western and eastern-central portions of the SWMU during the spring inspection. Surface water ponding was observed within the localized low spots during the spring inspection event. Following the fall inspection event, approximately 56 cubic yards (cy) of clay fill material was transported to the site from the HSAAP borrow pit. The clay fill was compacted into the low spots/settlement areas followed by approximately 14 cy of topsoil which was spread on top of the clay fill. Following topsoil placement, a fescue seed blend and rye grass seed blend was spread throughout the restored areas. Following seeding, straw was placed over the seeded areas. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation.

- SWMUs 19/29—The sign was in good repair, accurate, and legible during both inspection events. No fences or gates are associated with this SWMU. The grass was approximately 6 to 12 in. high during the spring inspection and 2 to 3 ft tall during the fall inspection. During both inspection events, several large, partially buried pieces of asphalt were observed in the northeast corner of the SWMU and along the eastern side of the SWMU area. In addition, one large, partially buried piece of concrete was observed near the central portion of the SWMU. Bay West was given verbal confirmation in 2014 that these large, partially buried, immovable pieces of asphalt/concrete could remain in place. Smaller, moveable pieces of asphalt were not observed at the surface of the SWMU during either inspection event. The preferential drainage pathway repaired in 2013 and noted as beginning to reappear in the spring 2015 inspection was evident during both inspection events; however, good vegetative cover was observed over the area. This area will continue to be monitored for further erosion. The LUCIP inspections did not indicate any evidence of unauthorized excavation.

- SWMU 20—The sign was in good repair, accurate, and legible during both inspection events. No fences or gates are associated with this SWMU. The grass was approximately 6 to 24 in. high during either inspection. The area landscaped during the summer of 2014, which is located near the southern end of the SWMU, remained in very good condition, with thick vegetation cover and no signs of settlement, erosion, or surface water ponding throughout the inspection events. Sinkholes or evidence of previous sinkholes were not noted during either inspection event. The following observations were noted:
    - The two areas where construction debris was covered with clay cap in 2015 remained in good condition during both inspection events. The two areas had good vegetative cover and no surface water ponding was observed. In addition, the man-made ditch/drainage pathway at the base of the covered slope did not contain any water at the time of either inspection.
    - Construction debris was observed along the eastern portion of the SWMU during the inspections: bricks were observed on the quarry face, as well as orange terracotta pipe debris. New construction debris was observed along the eastern quarry face during the fall inspection event: tar paper, metal, glass, brick, terracotta piping, and ceramic tiles. It is likely that more debris was present beneath this newly observed debris.
- SWMU 26—The sign was in good repair, accurate, and legible during both inspection events. There are no fences or gates associated with this SWMU. The grass was approximately 6 to 12 in. high during the spring inspection in the larger SWMU area and 12 to 24 in. during the fall inspection. During the spring inspection, the smaller SWMU area to the north had 1- to 2-ft-tall vegetation which hindered the inspection of that area. Coal tar was not observed at the surface of the SWMU during either inspection. The area east of the access road which was restored following the spring 2017 inspection was in good condition during both inspections; thick vegetation was growing and no bare areas were visible. The thick vegetation surrounding the utility vaults near the center of the SWMU was not observed to be growing back during either inspection event. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation.
- SWMU 96—The signs were in good repair, accurate, and legible during both inspection events. No gates or fences are associated with this SWMU. The SWMU area is covered with gravel and has no vegetation; the gravel cap showed no signs of disturbance during either inspection event. The following observations were noted during the spring and fall inspections:
    - Standing water was observed throughout the east-southeastern portion of the SWMU during the fall inspection event. Surface water was not observed during the spring inspection event.
    - Numerous pieces of coal/slag were observed along the entire surface of the SWMU during both inspection events; concentrated along the northern perimeter of the SWMU adjacent to the railroad tracks. The coal/slag has been noted during previous inspection and does not require action; the coal/slag are left in place.
    - Bricks were observed scattered along the surface of the SWMU during both inspection events; these have been previously noted and are left in place and require no action.
    - As noted in these and previous inspections, coal tar remains encrusted on the concrete containment west of the SWMU. Additional areas with encrusted coal tar were observed along the railroad tracks and adjacent grating north of the building east of the SWMU, as

well as on a railroad tie just north of the SWMU area. These additional areas of encrusted coal tar were observed during both inspection events. These areas of encrusted coal tar have been noted during previous inspection events and do not require action at this time; the observed coal tar listed above is outside of the SWMU area.

  - Small pieces of coal tar (ranging from 0.5 to 10 cm in diameter) were observed at the surface along the north, east and west perimeters of the SWMU in the spring and along the north and west perimeters of the SWMU in the fall.
  - Suspect asbestos-containing material (ACM) was observed near the central portion of the SWMU area during both inspection events. The observed suspect ACM is suspect transite tile debris. The debris was left in place and HSAAP personnel were informed of its presence.
  - A fence had been installed along the northern perimeter of the SWMU south of the railroad tracks. This fence allows Eastman access to Area A. HSAAP environmental personnel indicated that the work was authorized, and all required notifications were conducted prior to initiating the work. The fence restricts access to the northern SWMU sign, as well as the railroad tracks north of the SWMU extents.

- SWMU 103—The sign was in good repair, accurate, and legible during both inspection events. The fence associated with this SWMU was also in good repair during both inspection events. The riprap drainage ditch was observed to be in good condition during both inspections. A large partially buried mass of coal tar was observed in the spring inspection, just south of the installation fence within the extents of the SWMU. The large mass was approximately 4 ft in diameter and 2-3 in. thick. The large mass was dug up with a shovel and broken down into smaller pieces and placed into a garbage bag. Repairs to the surface of the SWMU were not required following removal of the large mass of coal tar. Smaller pieces of coal tar (1 to 3 cm in diameter) were observed along the surface of the SWMU just north of the fence near the western extent of the SWMU during the spring inspections. Small pieces of coal tar were not observed on the surface of the SWMU during the fall inspection event. Coal tar is presumed to remain underwater at the bank of the river where it is historically observed and acknowledged by TDEC; TDEC is not requiring removal of this coal tar. Bay West did not attempt to access or inspect this area during either inspection event due to the steep decline toward the river bank and the thick vegetation covering the slope. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation.
- SWMUs 77/78/86/87—Two of the signs were in good repair, accurate, and legible during the spring inspection event. During the fall 2017 inspection, one sign near location H-87-1 appeared damaged; one bolt had come loose and ripped the sign, securing the sign with only three bolts. The damaged sign was repaired during the spring 2018 inspection. During the fall inspection event, all signs were in good repair. The surface of the SWMUs had thick vegetative cover with no areas bare of vegetation or stressed except for a small area surrounding monitoring well MW-73. The grass covering the SWMU area was approximately 6 in. high during the spring inspection and 2-3 ft tall during the fall inspection. An area approximately 6 ft by 10 ft within the northern portion of the SWMU near sealed well MW-72 had standing surface water during the spring inspection. This area has been previously been noted to have stressed/dead vegetation which is likely the result of the area being covered in surface water throughout portions of the year. Standing surface water was not observed during the fall inspection event. Storage containers adjacent to SWMU 87 (as

noted in previous inspections) remained overturned to prevent water accumulation; this was noted during both inspection events. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation.

- SWMU 88—The sign was in good repair, accurate, and legible during both inspection events. The surface of the SWMU area had thick vegetation cover with no areas bare of vegetation. The vegetation was approximately 6 in. tall during the spring inspection and 4-5 ft tall during the fall inspection. No fences or gates are associated with this SWMU. No materials or equipment were observed to be stored on the SWMU area during either inspection event. The LUCIP inspections did not indicate any evidence of unauthorized cap disturbance or excavation.
- SWMU 109—The signs were accurate, legible, sturdy, and clear of vegetation. There was no sign of unauthorized activities or excavations. There are no fences or gates associated with this SWMU. The SWMU had good, thick vegetative cover; vegetation was approximately 6 in. tall during the spring inspection and 12 to 24 in. during the fall inspection event. No bare or stressed areas or vegetation were observed other than areas where coal tar was visible on the surface of the SWMU. One area of coal tar was observed on the surface of the SWMU within the western field. Coal tar was also visible on the surface of the SWMU within the cooling channel and north of the cooling channel towards the railroad embankment slope. TDEC is not requiring removal of coal tar from SWMU 109. No signs of settlement or erosion were observed. There was water in both the cooling channel and the drainage ditch during both inspection events.

The inspections completed by HSAAP used the same inspection criteria as described above. The HSAAP Landfill Cap/Cover Inspection Report Forms can be found in **Appendices D.3** and **D.4**.

5.2 MONITORING WELL MAINTENANCE AND ABANDONMENT

5.2.1 Monitoring Well Maintenance and Repairs

During spring and fall 2018, the LTM wells were observed to be in good overall condition (**Appendix A.4**). No routine maintenance was required.

5.2.2 Monitoring Well Plug and Abandonment

No monitoring wells were abandoned in 2018.

6.0 RECOMMENDATIONS FOR 2019 SITE-WIDE LONG-TERM MONITORING/LONG-TERM OPERATIONS

The 2018 groundwater monitoring activities comprised the fourteenth year of the LTM/LTO Program. The 2018 activities also represented the tenth year of LTM/LTO, as required by the approved Final *Corrective Measures Report for AOC-GW, Site-Wide Groundwater (HSAAP-33), Holston Army Ammunition Plant, Kingsport, Tennessee* (Bay West and SAIC, 2007c), and the sixth year of Holston River surface water sampling conducted under the LTM program per the 2013 CAO (TDEC, 2013). The 2018 monitoring focused on the following:

- Continued monitoring of contaminant trends and groundwater quality conditions (benzene, methylene chloride, and naphthalene) downgradient of Area A legacy sources.
- Evaluation of SVOCs (bis[2-ethylhexyl]phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, naphthalene, and n-nitrosodiphenylamine) and RCRA metals (arsenic and lead) concentrations trends and monitoring for evidence of migration in wells downgradient of SWMUs 19/29 (wells MW-48, MW-114, MW-115, and MW-116).
- Evaluation of RDX; arsenic; and chromium concentration trends in boundary well MW-68, located at the downgradient boundary of SWMU 20.
- Evaluation of mercury concentration trends in well MW-70, located downgradient of SWMU 18.
- Monitoring of groundwater quality for chlordane, dieldrin, and bromacil following completed soil source removal actions at pesticide-contaminated areas (SWMU 88 and SWMUs 77/78/86/87).
- Evaluation of explosives concentration trends (e.g., 2,4- DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) in the Area B explosives production area (well MW-99).
- Continued monitoring for evidence of target analytes (2,4-DNT; 2,6-DNT; 2,4,6-TNT; 2-amino-4,6-DNT; 4-amino-2,6-DNT; nitroglycerin; and RDX) contaminant migration at wells located along the downgradient boundary of the Area B production area.
- Evaluation of degradation and attenuation of RDX at specified monitoring locations (MW-68 and MW-99).
- Monitoring for evidence of BTEX contaminant releases to groundwater at SWMU 50 (Burning Ground; boundary well STMW-15).
- Collecting Holston River surface water samples for CAO-listed target analytes to monitor for potential impacts to the Holston River from groundwater discharge.

As described in **Section 4.4**, the 2018 sampling yielded sufficient data to assess the current groundwater conditions near the SWMUs and AOCs discussed above and showed that there is no evidence that groundwater discharge is impacting the Holston River.

The LTM/LTO Program includes inspections and maintenance activities associated with landfill caps, inspections of aprons and catch basins associated with SWMU 3, and inspections of the groundwater monitoring network. Eight landfill cap inspections were conducted in 2018 by Bay West and Leidos and four LUCIP inspections were conducted in 2018. In addition, HSAAP conducted landfill inspections and LUCIP inspections at 10 other sites. In 2018, coal tar removal

was conducted at SWMUs 4, 14, 96, and 103 and landscaping repairs were conducted at SWMU 18. HSAAP removed surface coal tar at SWMU 24 following its own inspection of this area. No routine maintenance was required on any of the LTM monitoring wells in 2018. No monitoring wells were abandoned in 2018.

6.1 LTM RECOMMENDATIONS

The following LTM recommendations are proposed for 2019:

- The 2019 LTM/LTO Program should continue as specified in the final remedy for Area of Concern – Site-Wide Groundwater (AOC-GW), which is outlined in the Final Corrective Measures Report (Bay West and SAIC, 2007c) and updated in the CAO that went into effect on January 24, 2013. The 2019 LTM sampling schedule is presented in **Table 6-1**. Revision of the LTM sampling will be completed as part of negotiations during the next CAO modification submitted to TDEC in draft form on March 6, 2019. Suggested recommendations may include removing wells from the sampling program, eliminating analytes from the sampling program, and reducing the frequency of sampling.
- Annual Holston River surface water monitoring at three locations: upgradient of Area B, downgradient of the IWTP discharge, and downgradient of Area B. Per the CAO, Holston River surface water sampling should be conducted in fall 2019.
- Continue semiannual inspections of monitoring wells included in the LTM/LTO Program.
- Complete monitoring well maintenance as needed, including replacement of any wear-and-tear items (e.g., dedicated tubing) where necessary.

6.2 LTO RECOMMENDATIONS

The following LTO recommendations are proposed for 2019:

- Continue semiannual inspections of the eight landfills and coal tar sites.
- Continue LUCIP inspections of the two pesticide sites, SWMU 3 and SWMU 109.
- Maintain the landfill components (e.g., caps, drainage controls, vegetative covers, and signs) as needed.
- Remove coal tar, as needed, at coal tar sites SWMUs 4, 14, 26, 96, and 103.

Both the LTM and LTO activities continue to protect human health and the environment by preventing exposure to contaminated materials. The groundwater LTM program is providing confirmation that contaminants are not migrating. The landfill inspections are identifying repairs needed to maintain the integrity of the caps. The LUC inspections are monitoring for unauthorized excavation at sites where waste remains in place.

Table 6-1 Recommended HSAAP Spring and Fall 2019 Sampling

Area	Source Unit	Location	Parameter	Spring	Fall
Area A	SWMU 96	MW-104	VOCs: • benzene • methylene chloride SVOCs: • naphthalene	X	X
		MW-105	VOCs: • benzene • methylene chloride SVOCs: • naphthalene	X	X
		MW-106	VOCs: • benzene • methylene chloride SVOCs: • naphthalene	X	X
		MW-107	VOCs: • benzene • methylene chloride SVOCs: • naphthalene	X	X
Area B Landfill Areas	SWMUs 19/29	MW-48	SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • lead	X	X
		MW-114	SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • lead	X	X

Table 6-1 Recommended HSAAP Spring and Fall 2019 Sampling (continued)

Area		Source Unit	Location	Parameter	Spring	Fall
Area B Landfill Areas (continued)		SWMUs 19/29 (continued)	MW-115	SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • lead	X	X
			MW-116	SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • lead	X	X
		SWMU 20	MW-68	RDX MNA[a]: • DNX • MNX • TNX RCRA metals: • arsenic • chromium (total)	X	X
Area B Explosives Production and Shop Areas	Installation Boundary Near Holston River	Explosives Production Area SWMUs and AOCs	MW-11	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • Nitroglycerin • RDX	X	NS
			MW-91	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • Nitroglycerin • RDX	X	NS

Table 6-1 Recommended HSAAP Spring and Fall 2019 Sampling (continued)

Area		Source Unit	Location	Parameter	Spring	Fall
Area B Explosives Production and Shop Areas (continued)	Installation Boundary Near Holston River (continued)	Explosives Production Area SWMUs and AOCs (continued)	MW-101	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • Nitroglycerin • RDX	X	NS
			MW-102	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • Nitroglycerin • RDX	X	NS
			MW-S1A	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	X	NS
		SWMU 50	STMW-15	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX BTEX: • benzene • toluene • ethylbenzene • xylenes	X	NS
	Interior Source Area Trending/ Corrective Measures Performance	Explosives Production Area	MW-99	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX MNA[b]: • DNX • MNX • TNX	X	NS
		SWMU 18	MW-70	Mercury	X	NS

Table 6-1 Recommended HSAAP Spring and Fall 2019 Sampling (continued)

Area		Source Unit	Location	Parameter	Spring	Fall
Area B Explosives Production and Shop Areas (continued)	Interior Source Area Trending/ Corrective Measures Performance (continued)	SWMUs 77/78/86/87	MW-73	Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil	X	NS
			MW-75	Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil	X	NS
		SWMU 88	MW-86	Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil	X	NS
Holston River		Upgradient of Area B	SW-01	VOCs: • benzene • methylene chloride SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • chromium (total) • lead • mercury Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	NS	X

Table 6-1 Recommended HSAAP Spring and Fall 2019 Sampling (continued)

Area	Source Unit	Location	Parameter	Spring	Fall
Holston River (continued)	Downgradient of the IWTP Discharge at Area B	SW-02	VOCs: • benzene • methylene chloride SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • chromium (total) • lead • mercury Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	NS	X
	Downgradient of Area B	SW-03	VOCs: • benzene • methylene chloride SVOCs: • bis(2-ethylhexyl)phthalate • dibenzofuran • fluorene • 2-methylnaphthalene • naphthalene • n-nitrosodiphenylamine RCRA metals: • arsenic • chromium (total) • lead • mercury Pesticides: • alpha-chlordane • gamma-chlordane • dieldrin Bromacil	NS	X

Table 6-1 Recommended HSAAP Spring and Fall 2019 Sampling (continued)

Area	Source Unit	Location	Parameter	Spring	Fall
Holston River (continued)	Downgradient of Area B (continued)	SW-03 (continued)	Explosives: • 2,4-dinitrotoluene • 2,6-dinitrotoluene • 2,4,6-trinitrotoluene • 2-amino-4,6-dinitrotoluene • 4-amino-2,6-dinitrotoluene • nitroglycerin • RDX	NS	X

[a]MNA analysis performed on an annual basis at this well (spring event only).
AOC = Area of concern.
BTEX = Benzene, toluene, ethylbenzene, and xylenes.
DNX = Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine.
HSAAP = Holston Army Ammunition Plant.
IWTP = Industrial wastewater treatment plant.
MNA = Monitored natural attenuation (RDX degradation intermediates: DNX, MNX, and TNX, annual only).
MNX = Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine.
NS = Not sampled.
RCRA = Resource Conservation and Recovery Act.
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine.
SVOC = Semivolatile organic compound.
SWMU = Solid waste management unit.
TNX = Hexahydro-1,3,5-trinitroso-1,3,5-triazine.
VOC = Volatile organic compound.

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FIGURES

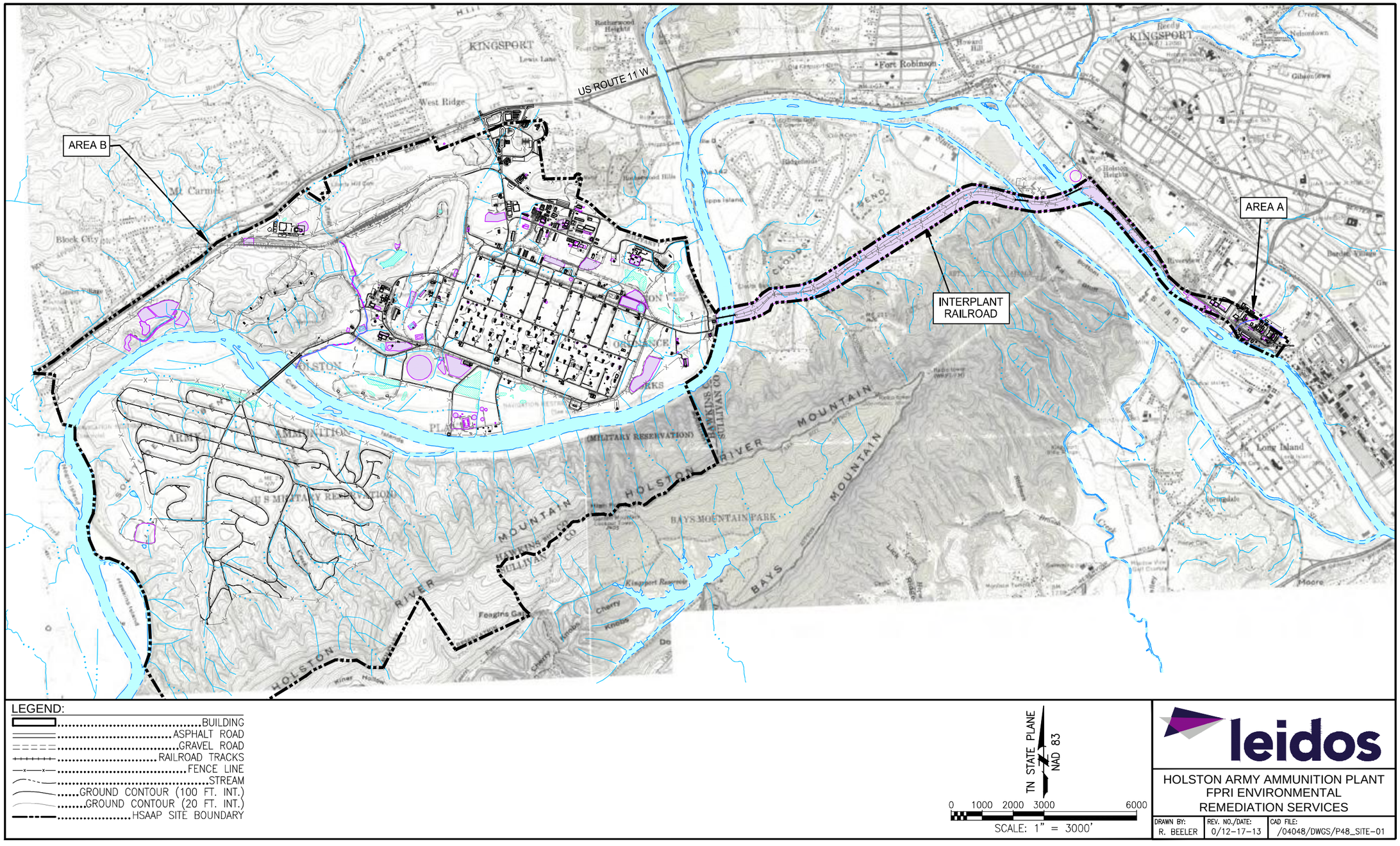


Figure 2-1. Holston Army Ammunition Plant Site Map

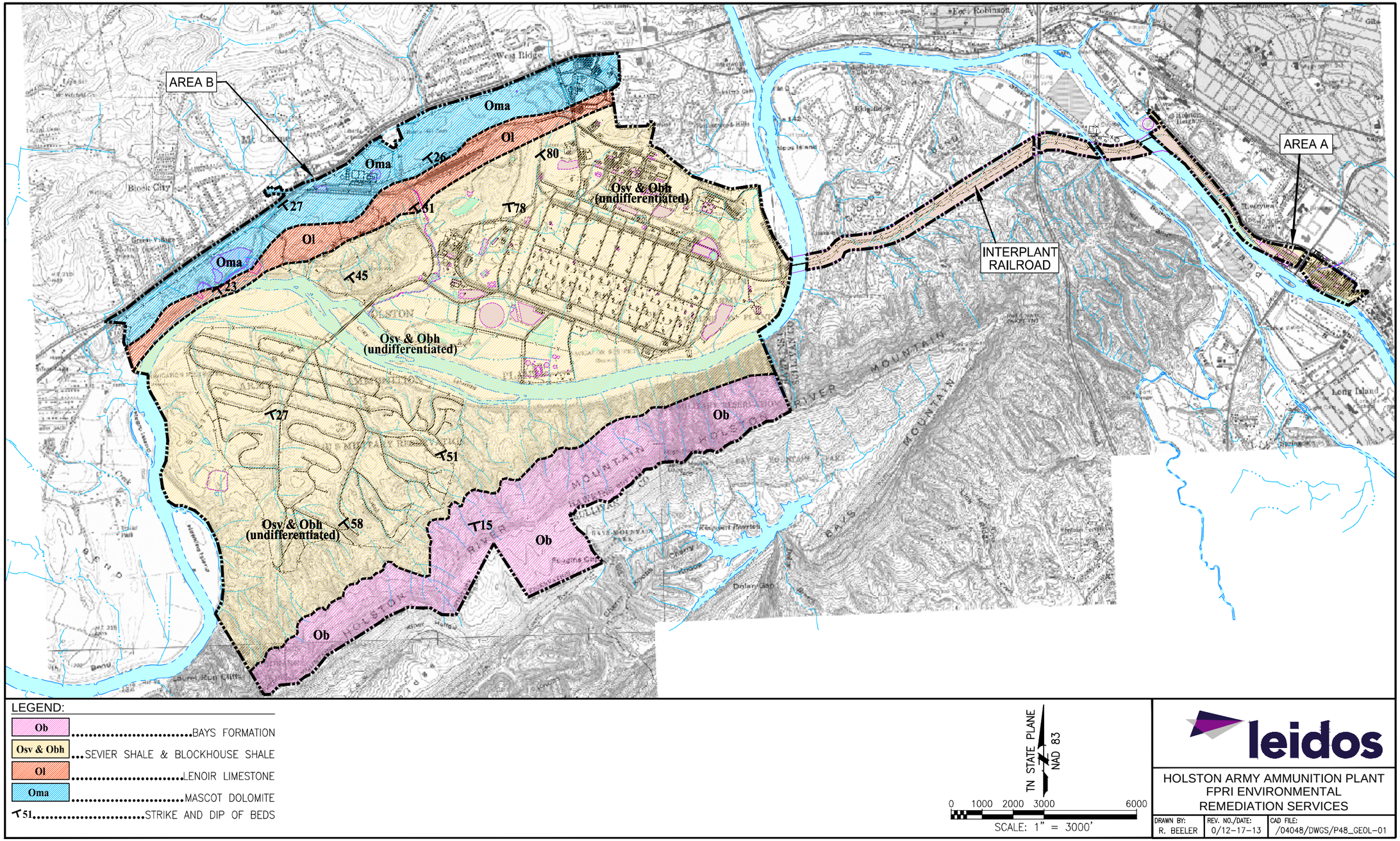


Figure 2-2. Holston Army Ammunition Plant Bedrock Geology Map

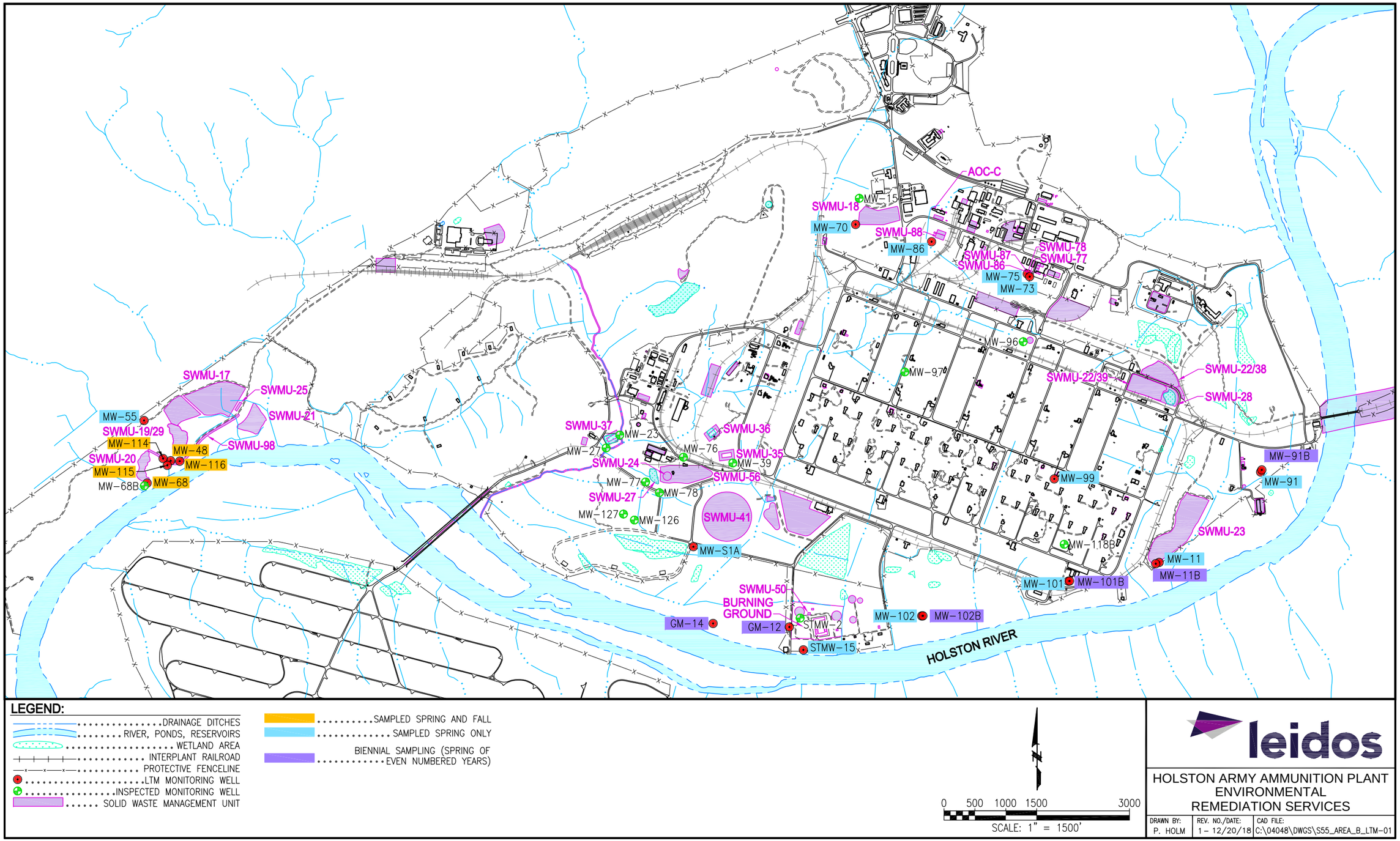


Figure 3-1. HSAAP Area B Long-Term Monitoring and Inspection Locations

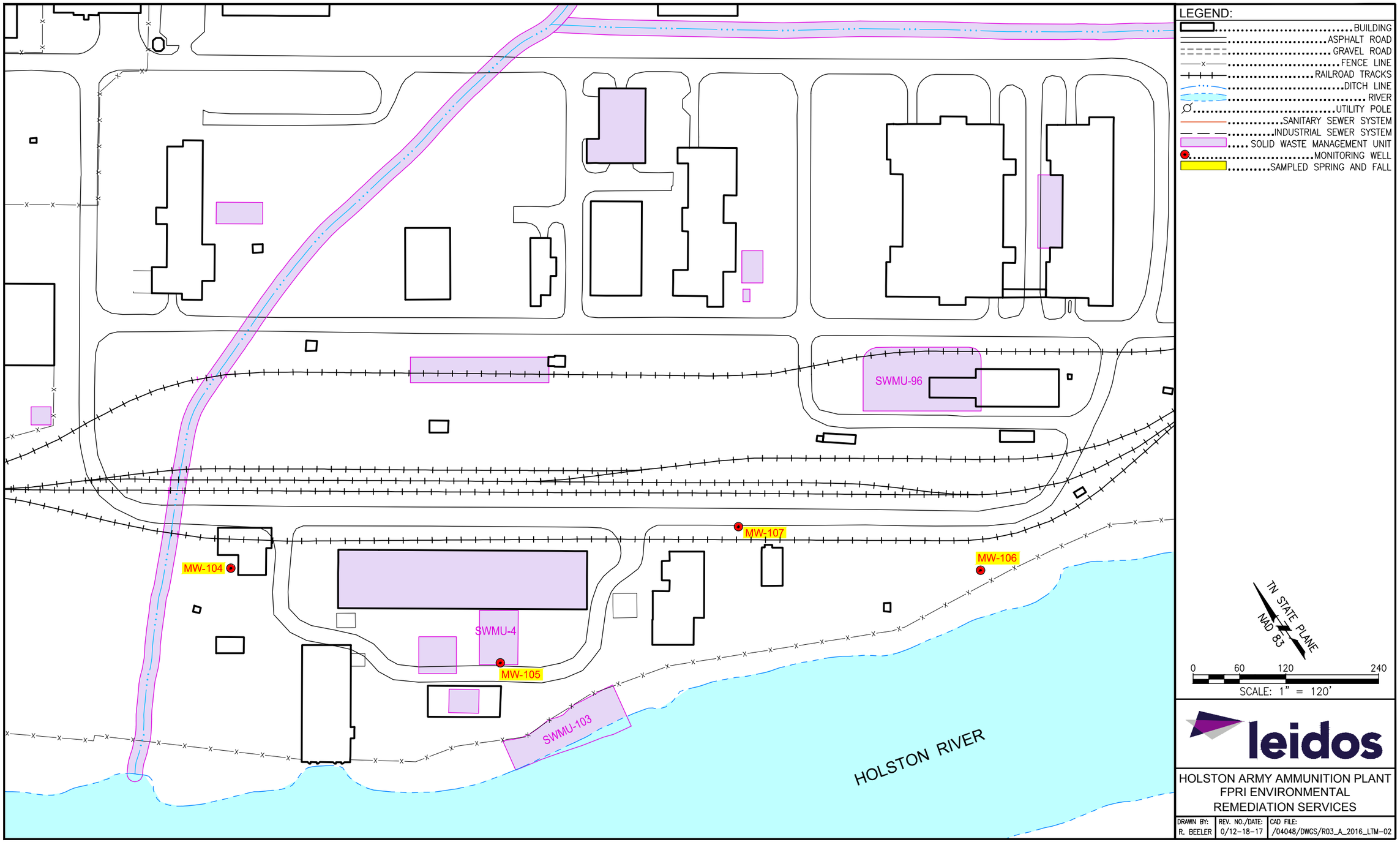


Figure 3-2. HSAAP Area A Long-Term Monitoring Locations

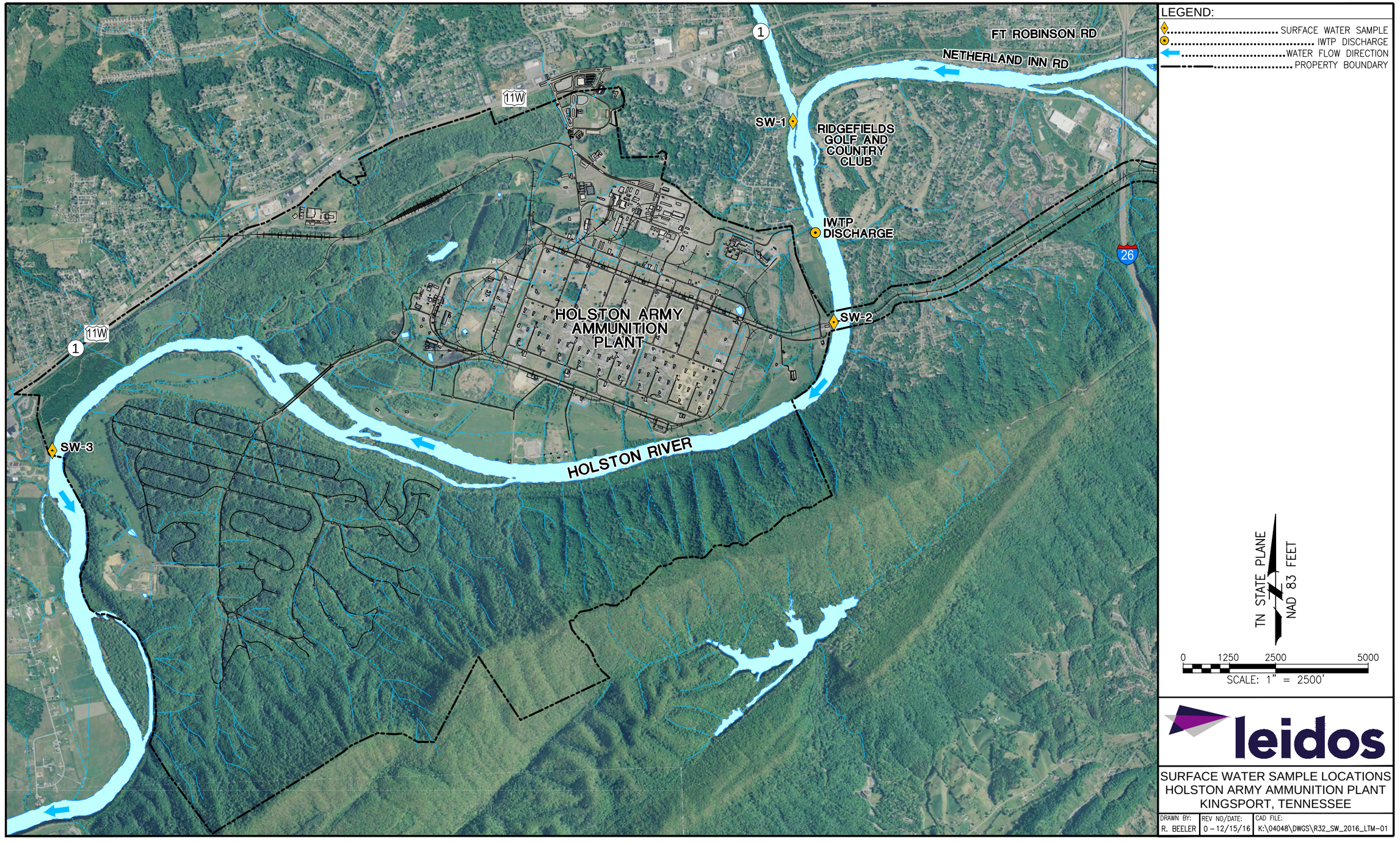


Figure 3-3. Surface Water Sample Locations

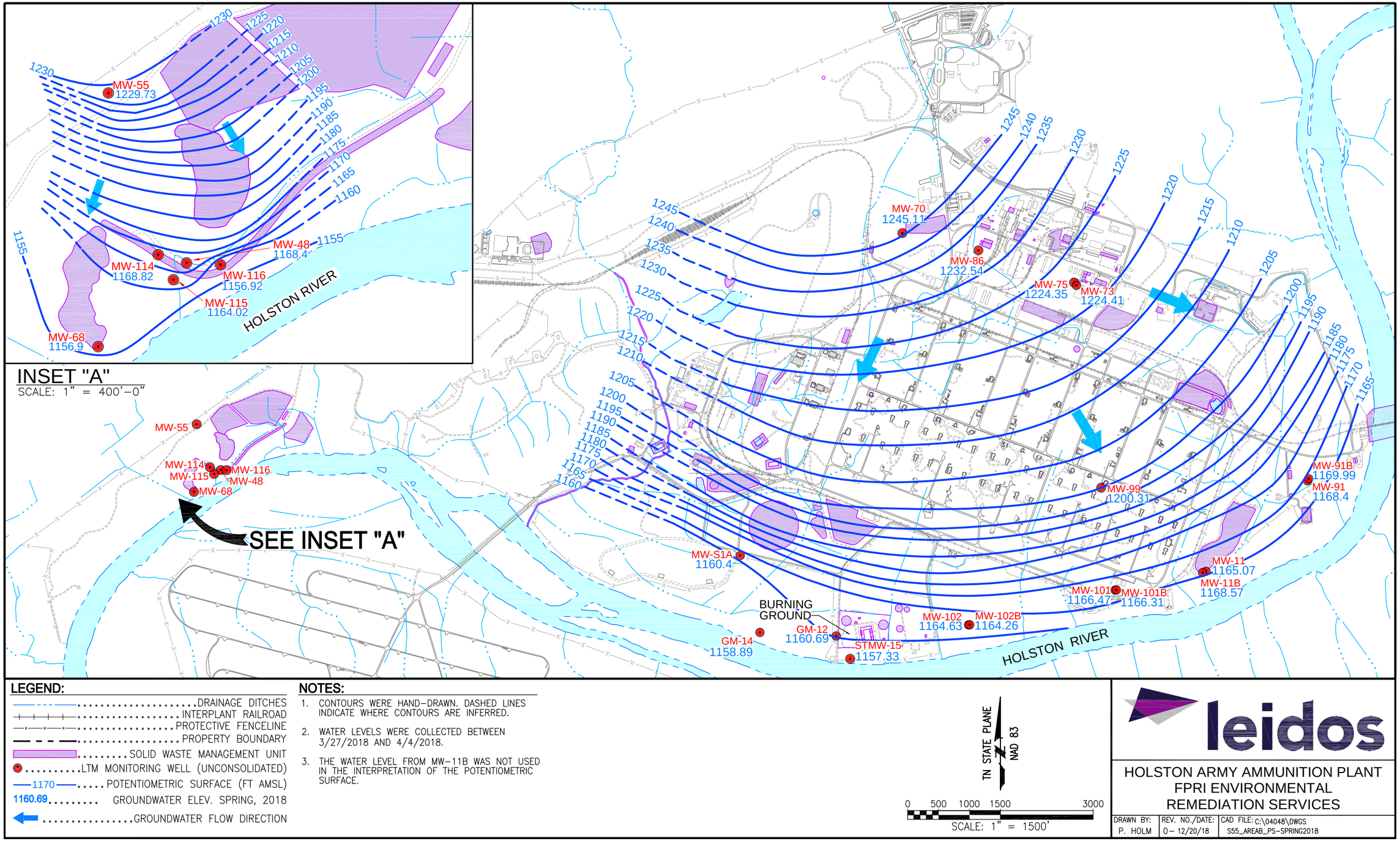
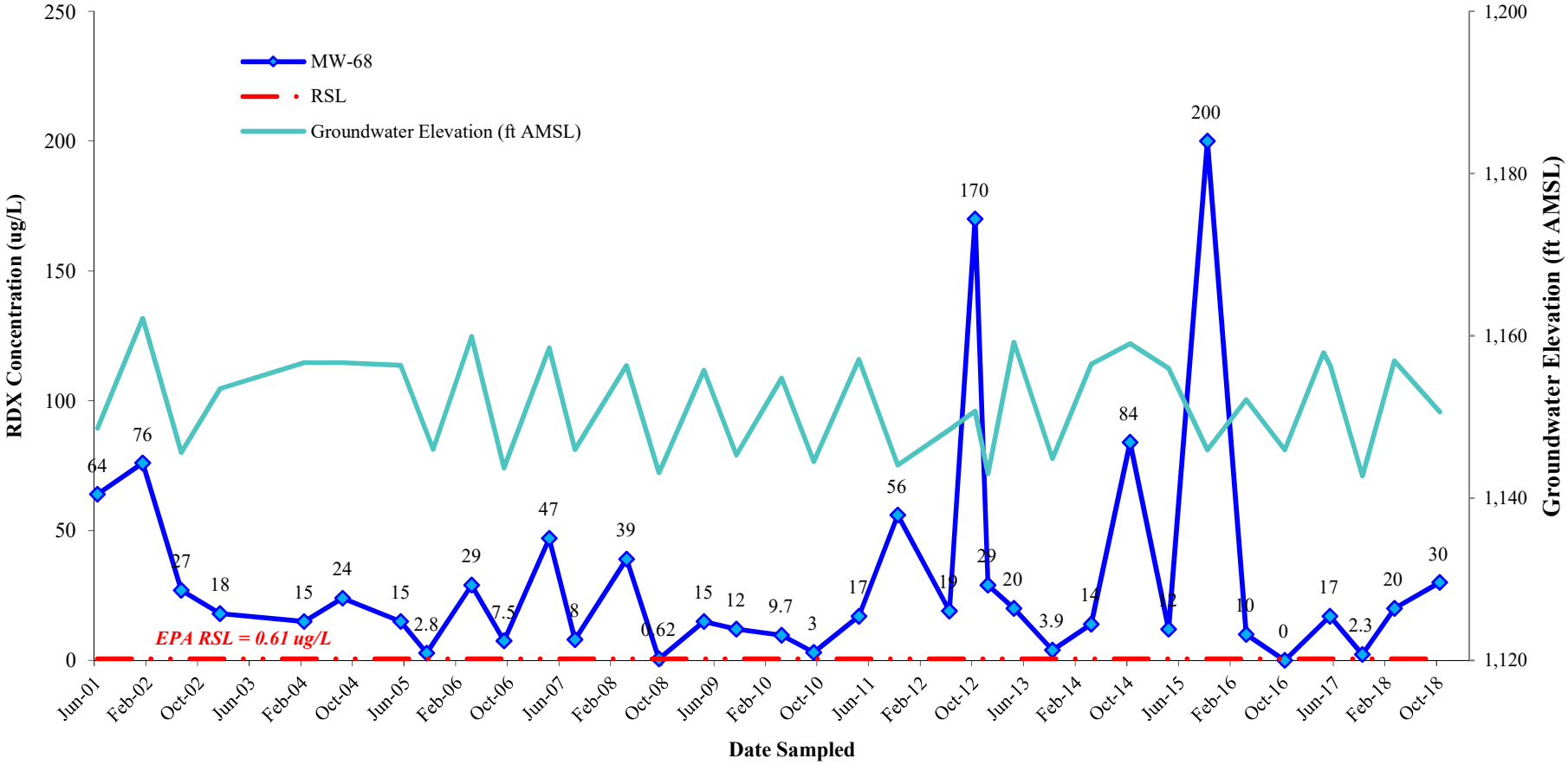


Figure 4-1. Potentiometirc Map for Area B of the Holston Army Ammunition Plant, Spring 2018

Figure 4-2. RDX Concentration Trend in MW-68 at SWMU 20, 2001 - 2018



Note: The RDX MCL is not available; the RSL is 0.61 µg/L, and the CAO-listed GWPS is 1,037 µg/L.

Figure 4-3. Mercury Concentration Trend in MW-70 at SWMU 18, 2000 – 2018

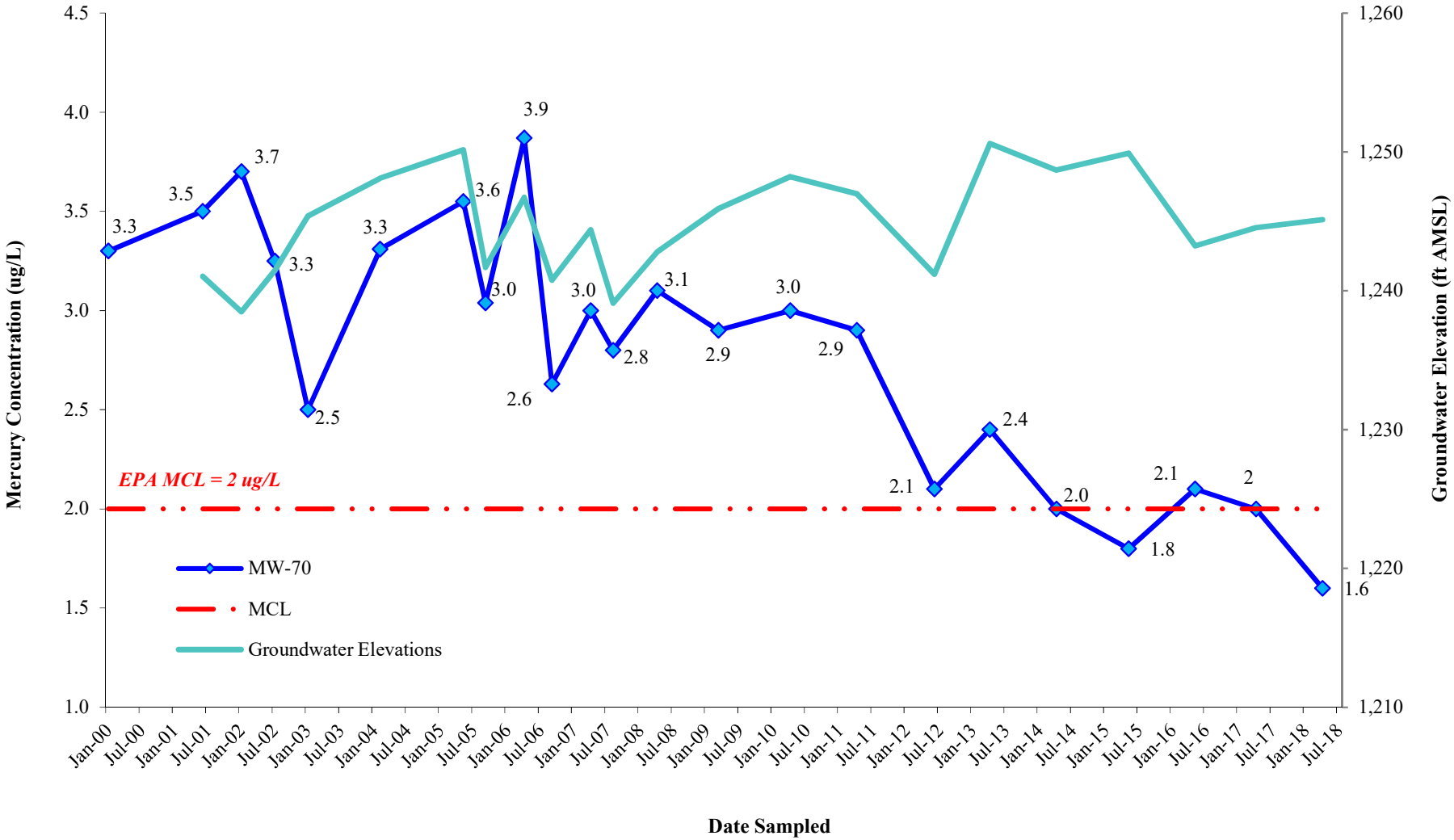
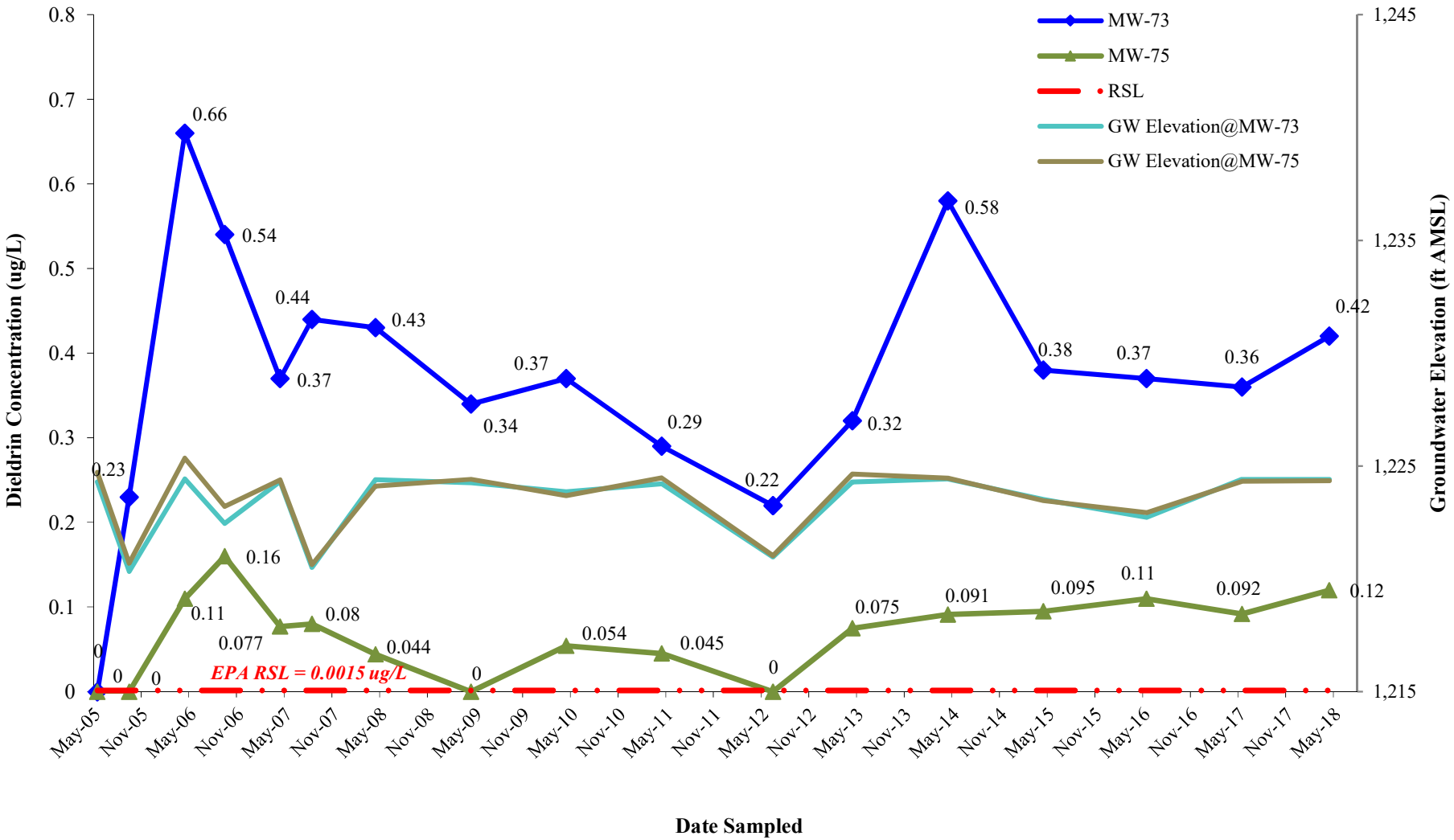


Figure 4-4. Dieldrin Concentration Trends in MW-73 and MW-75 at SWMUs 77/78/86/87, 2005 – 2018



Note that dieldrin was not detected in MW-86 at SWMU 88 in 2005, 2006, 2007,2014, 2015, 2016, 2017, and 2018

Figure 4-5. Total Chlordane Concentration Trends in MW-73 and MW-75 at SWMUs 77/78/86/87, 2005 – 2018

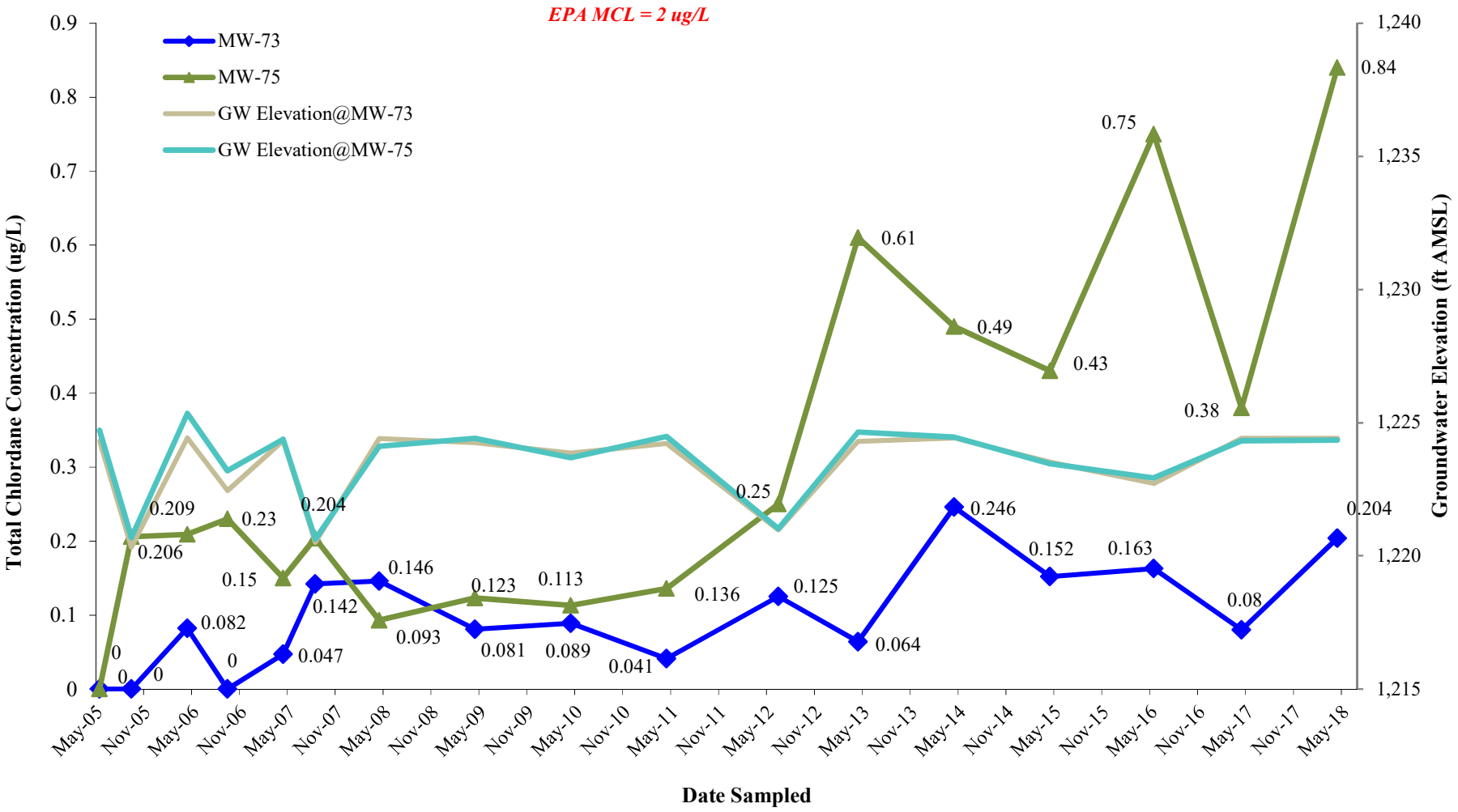
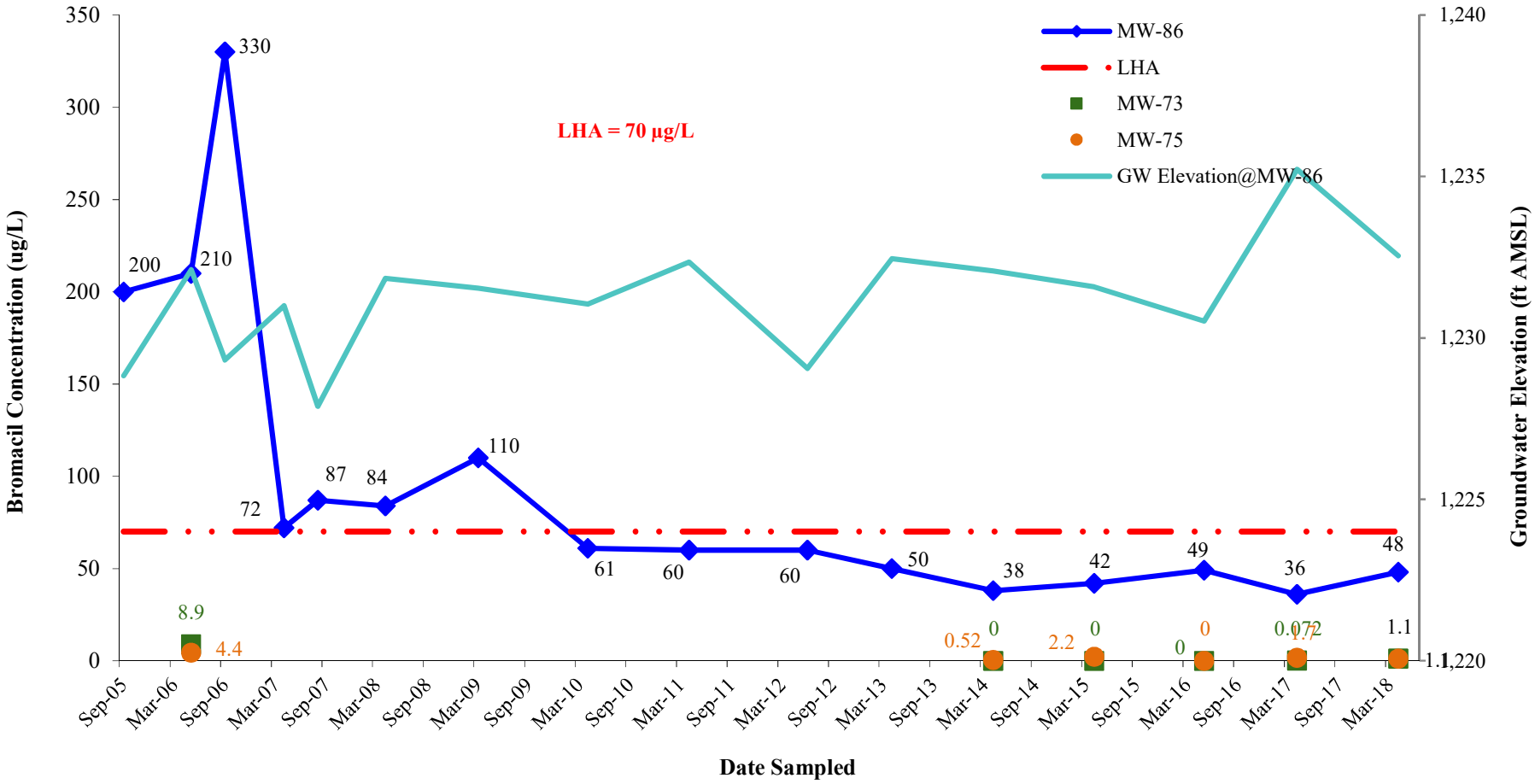
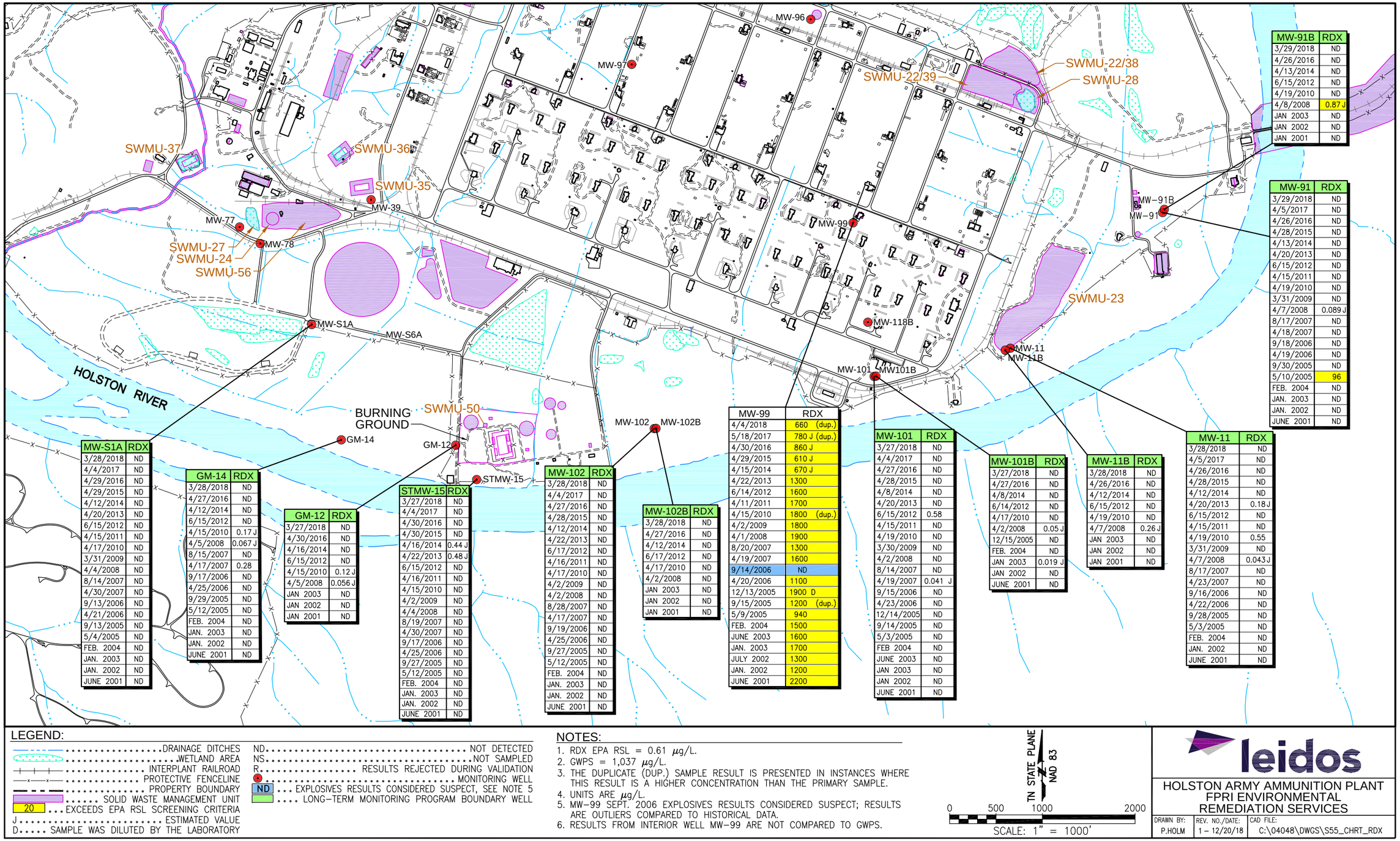


Figure 4-6. Bromacil Concentration Trends in MW-86, MW-75, and MW-73 at SWMU 88 and SWMUs 77/78/86/87, 2005 – 2018





MW-91B	RDX
3/29/2018	ND
4/26/2016	ND
4/13/2014	ND
6/15/2012	ND
4/19/2010	ND
4/8/2008	0.87 J
JAN 2003	ND
JAN 2002	ND
JAN 2001	ND

MW-91	RDX
3/29/2018	ND
4/5/2017	ND
4/26/2016	ND
4/28/2015	ND
4/13/2014	ND
4/20/2013	ND
6/15/2012	ND
4/15/2011	ND
4/19/2010	ND
3/31/2009	ND
4/7/2008	0.089 J
8/17/2007	ND
4/18/2007	ND
9/18/2006	ND
4/19/2006	ND
9/30/2005	ND
5/10/2005	96
FEB. 2004	ND
JAN. 2003	ND
JAN. 2002	ND
JUNE 2001	ND

MW-99	RDX
4/4/2018	660 (dup.)
5/18/2017	780 J (dup.)
4/30/2016	860 J
4/29/2015	610 J
4/15/2014	670 J
4/22/2013	1300
6/14/2012	1600
4/11/2011	1700
4/15/2010	1800 (dup.)
4/2/2009	1800
4/1/2008	1900
8/20/2007	1300
4/19/2007	1600
9/14/2006	ND
4/20/2006	1100
12/13/2005	1900 D
9/15/2005	1200 (dup.)
5/9/2005	940
FEB. 2004	1500
JUNE 2003	1600
JAN. 2003	1700
JULY 2002	1300
JAN. 2002	1200
JUNE 2001	2200

MW-101	RDX
3/27/2018	ND
4/4/2017	ND
4/27/2016	ND
4/28/2015	ND
4/8/2014	ND
4/20/2013	ND
6/15/2012	0.58
4/15/2011	ND
4/19/2010	ND
3/30/2009	ND
4/2/2008	ND
8/14/2007	ND
4/19/2007	0.041 J
9/15/2006	ND
4/23/2006	ND
12/14/2005	ND
9/14/2005	ND
5/3/2005	ND
FEB 2004	ND
JUNE 2003	ND
JAN 2003	ND
JAN 2002	ND
JUNE 2001	ND

MW-101B	RDX
3/27/2018	ND
4/27/2016	ND
4/8/2014	ND
6/14/2012	ND
4/17/2010	ND
4/2/2008	0.05 J
12/15/2005	ND
FEB. 2004	ND
JAN 2003	0.019 J
JAN 2002	ND
JUNE 2001	ND

MW-11B	RDX
3/28/2018	ND
4/26/2016	ND
4/12/2014	ND
6/15/2012	ND
4/19/2010	ND
4/7/2008	0.26 J
JAN 2003	ND
JAN 2002	ND
JAN 2001	ND

MW-11	RDX
3/28/2018	ND
4/5/2017	ND
4/26/2016	ND
4/28/2015	ND
4/12/2014	ND
4/20/2013	0.18 J
6/15/2012	ND
4/15/2011	ND
4/19/2010	0.55
3/31/2009	ND
4/7/2008	0.043 J
8/17/2007	ND
4/23/2007	ND
9/16/2006	ND
4/22/2006	ND
9/28/2005	ND
5/3/2005	ND
FEB. 2004	ND
JAN. 2002	ND
JUNE 2001	ND

MW-S1A	RDX
3/28/2018	ND
4/4/2017	ND
4/29/2016	ND
4/29/2015	ND
4/12/2014	ND
4/20/2013	ND
6/15/2012	ND
4/15/2011	ND
4/17/2010	ND
3/31/2009	ND
4/4/2008	ND
8/14/2007	ND
4/30/2007	ND
9/13/2006	ND
4/21/2006	ND
9/13/2005	ND
5/4/2005	ND
FEB. 2004	ND
JAN. 2003	ND
JAN. 2002	ND
JUNE 2001	ND

GM-14	RDX
3/28/2018	ND
4/27/2016	ND
4/12/2014	ND
6/15/2012	ND
4/15/2010	0.17 J
4/5/2008	0.067 J
8/15/2007	ND
4/17/2007	0.28
9/17/2006	ND
4/25/2006	ND
9/29/2005	ND
5/12/2005	ND
FEB. 2004	ND
JAN. 2003	ND
JAN. 2002	ND
JUNE 2001	ND

GM-12	RDX
3/27/2018	ND
4/30/2016	ND
4/16/2014	ND
6/15/2012	ND
4/15/2010	0.12 J
4/5/2008	0.056 J
JAN 2003	ND
JAN 2002	ND
JAN 2001	ND

STMW-15	RDX
3/27/2018	ND
4/4/2017	ND
4/30/2016	ND
4/30/2015	ND
4/16/2014	0.44 J
4/22/2013	0.48 J
6/15/2012	ND
4/16/2011	ND
4/15/2010	ND
4/2/2009	ND
4/4/2008	ND
8/19/2007	ND
4/30/2007	ND
9/17/2006	ND
4/25/2006	ND
9/27/2005	ND
5/12/2005	ND
FEB. 2004	ND
JAN. 2003	ND
JAN. 2002	ND
JUNE 2001	ND

MW-102	RDX
3/28/2018	ND
4/4/2017	ND
4/27/2016	ND
4/28/2015	ND
4/12/2014	ND
4/22/2013	ND
6/17/2012	ND
4/16/2011	ND
4/17/2010	ND
4/2/2009	ND
4/2/2008	ND
8/28/2007	ND
4/17/2007	ND
9/19/2006	ND
4/25/2006	ND
9/27/2005	ND
5/12/2005	ND
FEB. 2004	ND
JAN. 2003	ND
JAN. 2002	ND
JUNE 2001	ND

MW-102B	RDX
3/28/2018	ND
4/27/2016	ND
4/12/2014	ND
6/17/2012	ND
4/17/2010	ND
4/2/2008	ND
JAN 2003	ND
JAN 2002	ND
JAN 2001	ND

LEGEND:

- DRAINAGE DITCHES
- WETLAND AREA
- INTERPLANT RAILROAD
- PROTECTIVE FENCELINE
- PROPERTY BOUNDARY
- SOLID WASTE MANAGEMENT UNIT
- 20 ... EXCEEDS EPA RSL SCREENING CRITERIA
- J ... ESTIMATED VALUE
- D ... SAMPLE WAS DILUTED BY THE LABORATORY
- ND ... NOT DETECTED
- NS ... NOT SAMPLED
- R ... RESULTS REJECTED DURING VALIDATION
- MONITORING WELL
- ND ... EXPLOSIVES RESULTS CONSIDERED SUSPECT, SEE NOTE 5
- LONG-TERM MONITORING PROGRAM BOUNDARY WELL

NOTES:

1. RDX EPA RSL = 0.61 µg/L.
2. GWPS = 1,037 µg/L.
3. THE DUPLICATE (DUP.) SAMPLE RESULT IS PRESENTED IN INSTANCES WHERE THIS RESULT IS A HIGHER CONCENTRATION THAN THE PRIMARY SAMPLE.
4. UNITS ARE µg/L.
5. MW-99 SEPT. 2006 EXPLOSIVES RESULTS CONSIDERED SUSPECT; RESULTS ARE OUTLIERS COMPARED TO HISTORICAL DATA.
6. RESULTS FROM INTERIOR WELL MW-99 ARE NOT COMPARED TO GWPS.

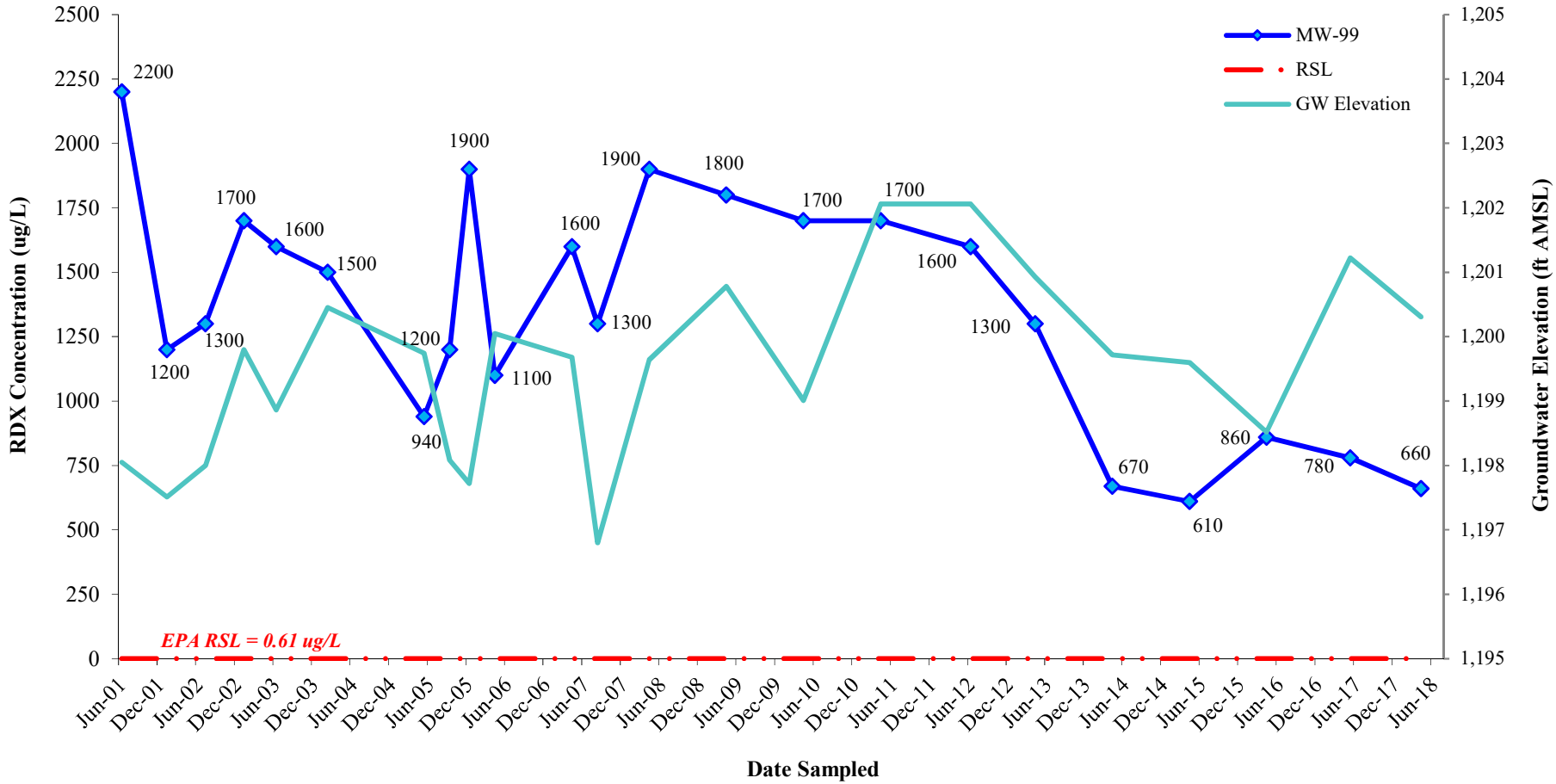
leidos

HOLSTON ARMY AMMUNITION PLANT
FPRI ENVIRONMENTAL
REMEDIATION SERVICES

DRAWN BY:	REV. NO./DATE:	CAD FILE:
P.HOLM	1 – 12/20/18	C:\04048\DWGS\S55_CHRT_RDX

Figure 4-7. Distribution of RDX in the Area B Explosives Production Area, 2001-2018

Figure 4-8. RDX Concentration Trend in MW-99 in the Explosives Production Area, 2001 – 2018



Note: The September 2006 result is suspect; data are from a Sample Data Group with multiple results that are outliers compared to historical data. As a result, the September 2006 data were removed from the trend graph. The September 2005, April 2006, and April 2018 values are based on the sample duplicates, which had higher concentrations than the main samples

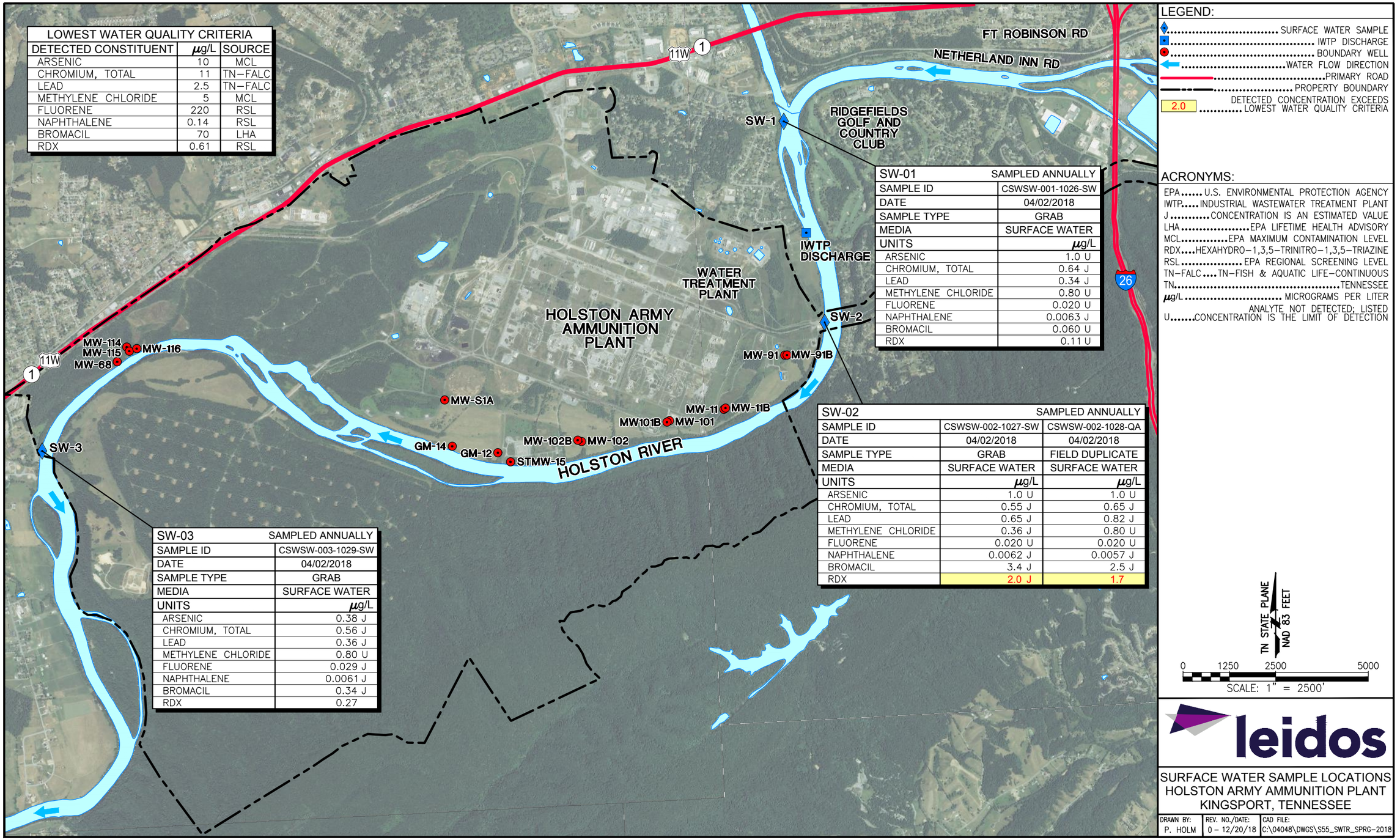
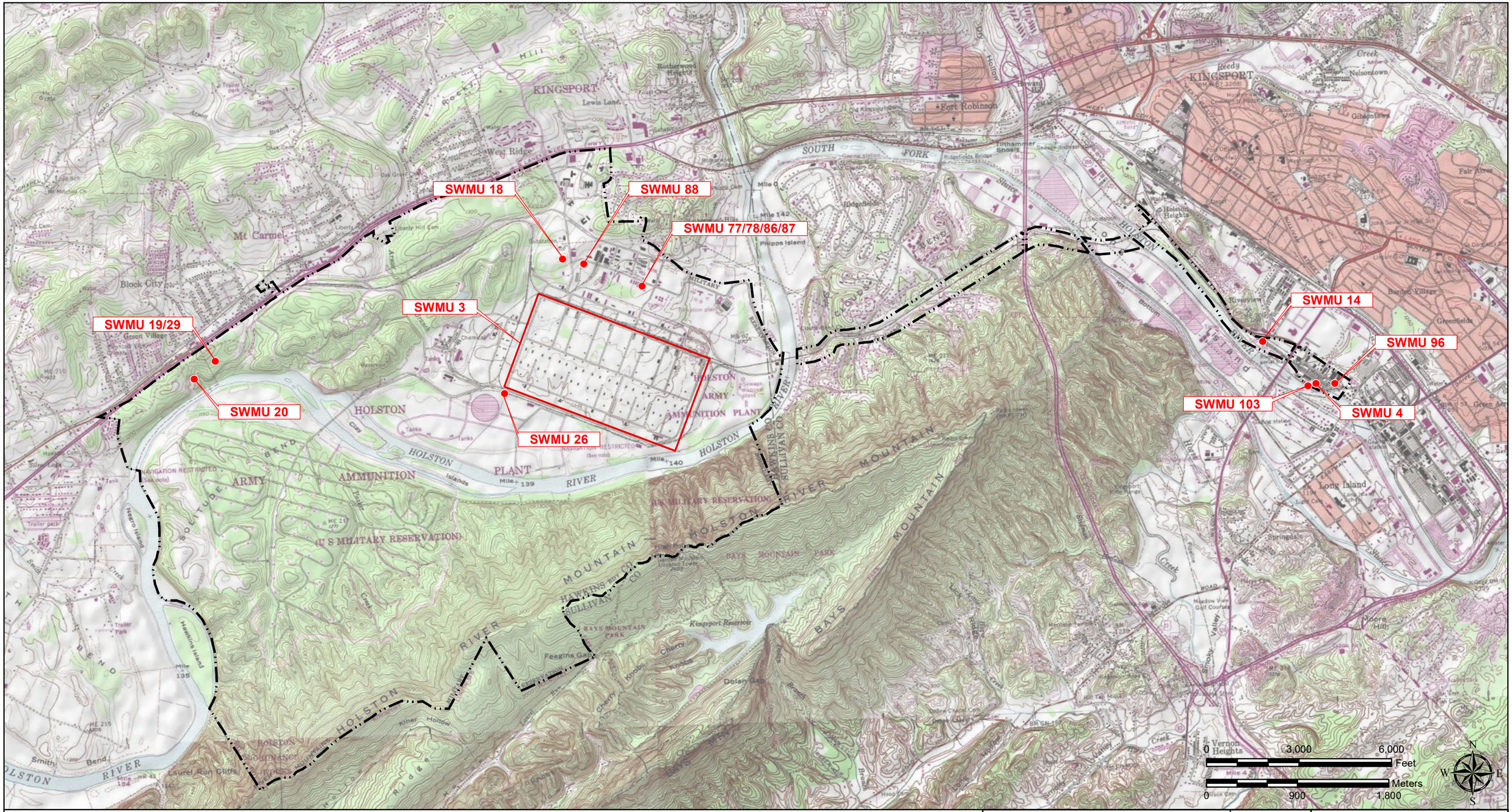


Figure 4-9. Detected Constituents in Surface Water - Spring 2018



SWMU Location

Installation Boundary

Note: AOC-GW is plant-wide

SOURCES: Basemap: 2013 National Geographic Society, i-cubed WMS

ENGR'G:	SG	DATE	Bay West — Customer-Focused Environmental & Industrial Solutions
DRAWN:	SG	12/18/2013	
REV:	NJ	11/6/2018	
PROJECT NAME:	HSAAP - KINGSPORT, TN		
TITLE: LANDFILLS INSPECTED DURING 2018 LONG-TERM OPERATIONS PROGRAM			
DWG. NO: J160167	SCALE: 1:3,000	FIGURE #: 5-1	

COAL TAR REMOVED (04/01/18)

COAL TAR REMOVED (10/18/18)

CULVERT

EXISTING MONITORING WELL

UTILITY MANHOLES/HATCHES

SIGN

CULVERT

FENCE

FORMER DITCH APPROXIMATE LOCATION

TRANSITE WATER LINE

APPROXIMATE SWMU 4 LIMITS

RAW WATER TANK

N

W E

S

0 50 100 Feet

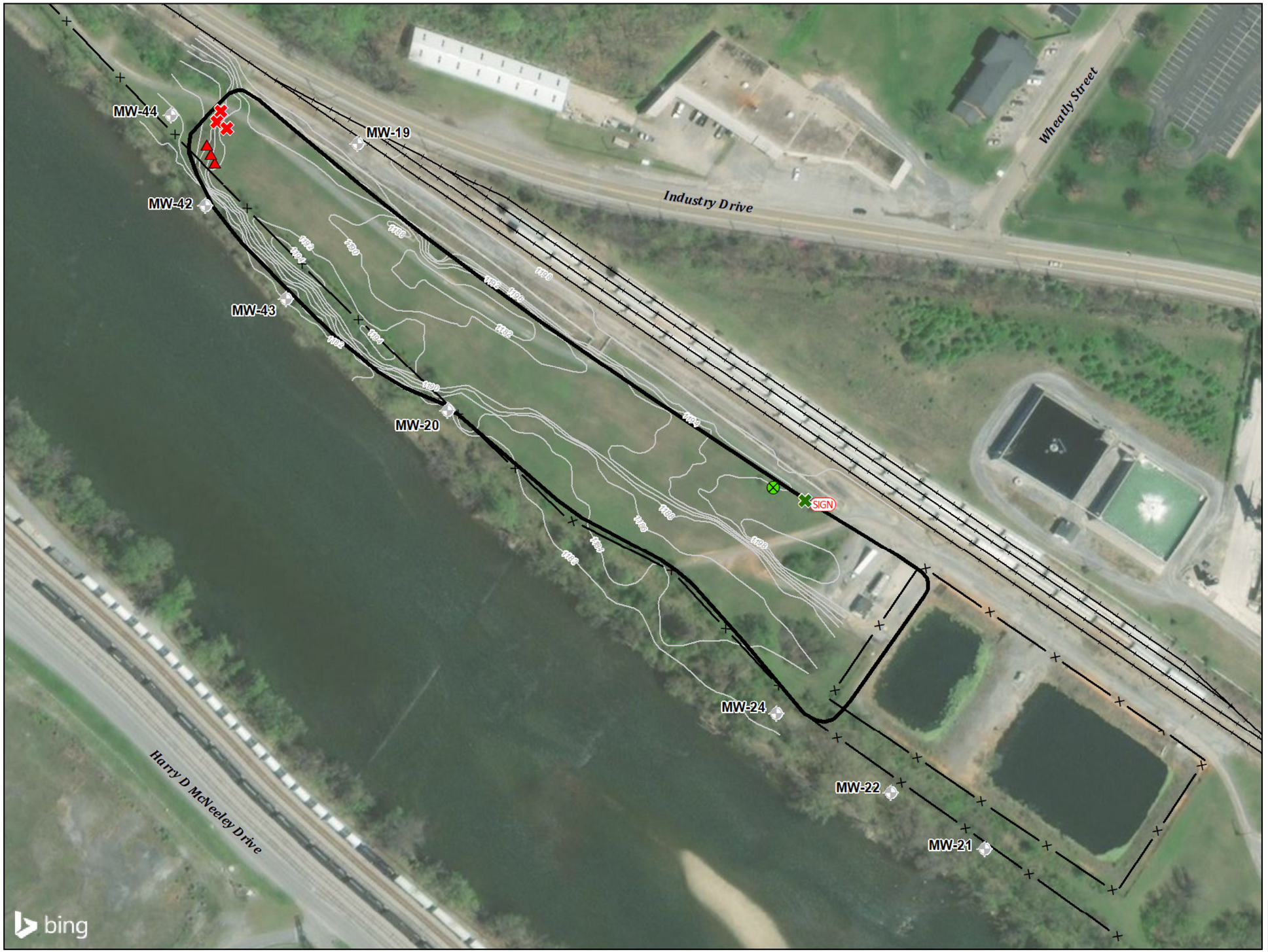
0 15 30 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: Bing Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G S.M.	DATE	Bay West Customer-Focused Environmental & Industrial Solutions	
DRAWN T.P.	11/22/04		
REV. N.J.	11/06/18		
PROJECT NAME	HSAAP - KINGSPORT, TN		
TITLE	SWMU 4 SITE MAP 2018 LTM/LTO REPORT		
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-2	

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-2 SWMU 4 Site Map 2018 LTM_LTO.mxd



PARTIALLY BURIED PIPES

TREES DIRECTLY BEHIND SWMU SIGN

COAL TAR REMOVED (04/01/18)

SPROUTING TREES AROUND FIRE HYDRANT (10/18/18)

ABANDONED MONITORING WELL

SIGN

APPROXIMATE SWMU 14 LANDFILL LIMITS

FENCE

RAILROAD

GROUND SURFACE ELEVATION CONTOUR IN FEET

N
W E
S

0 125 250 Feet

0 30 60 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: Bing Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G S.M.	DATE	Bay West Customer-Focused Environmental & Industrial Solutions	
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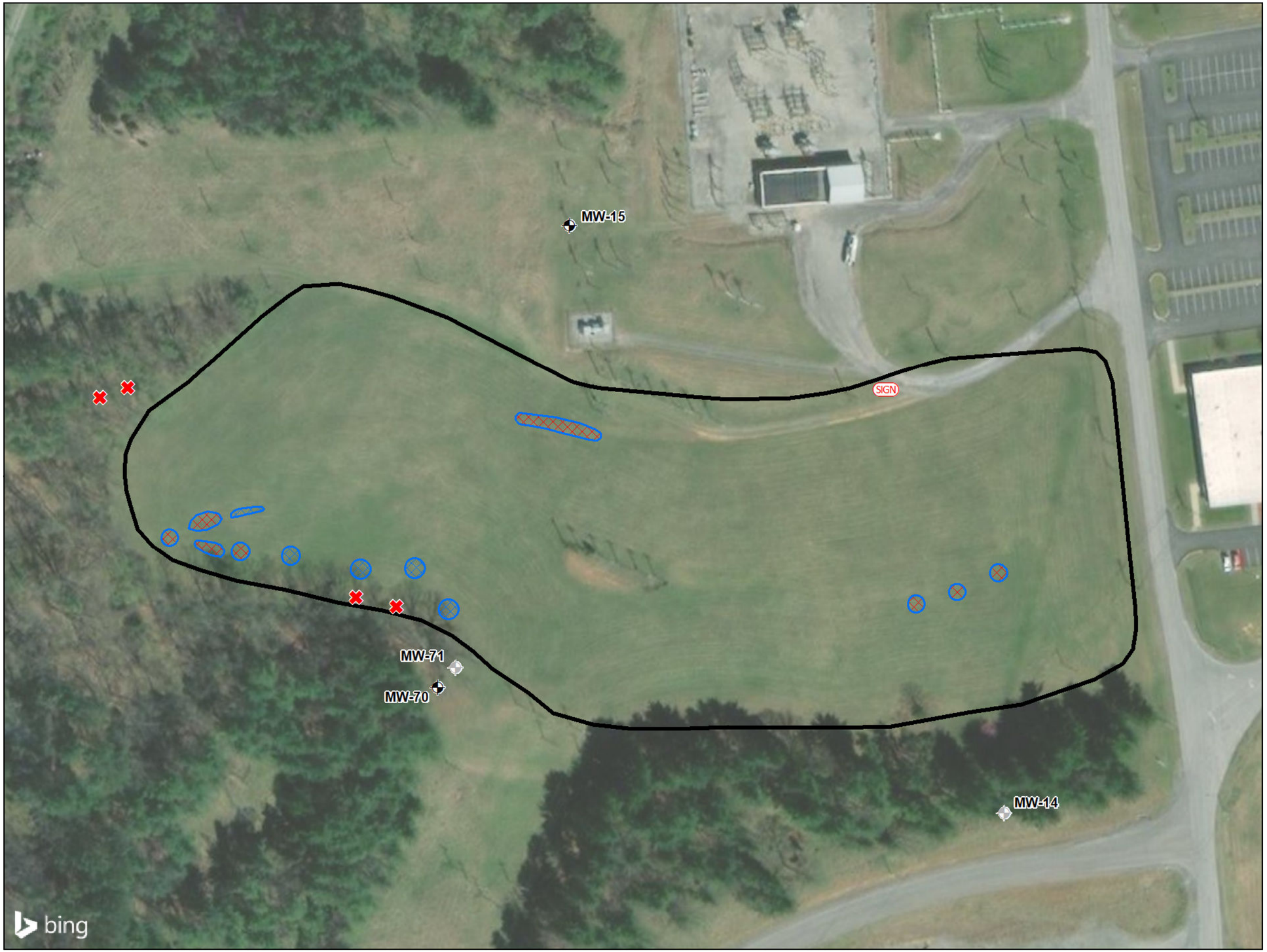
REV. N.J.	11/06/18		
PROJECT NAME	HSAAP - KINGSPORT, TN		
TITLE	SWMU 14 SITE MAP 2018 LTM/LTO REPORT		
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-3	

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-3 SWMU 14 Site Map 2018 LTM_LTO.mxd



CONCRETE DEBRIS

ABANDONED MONITORING WELL

EXISTING MONITORING WELL

SIGN

LOW SPOT/SETTLEMENT AREAS (03/26/18)

LOW SPOT/SETTLEMENT AREAS REPAIRED & RESTORED (10/22/18)

APPROXIMATE SWMU 18 LANDFILL LIMITS/AREA OF RESTRICTED EXCAVATION

N
W E
S

0 100 200 Feet

0 30 60 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: Bing Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G S.M.	DATE	Bay West Customer-Focused Environmental & Industrial Solutions
DRAWN T.P.	11/22/04	
REV. N.J.	11/06/18	
PROJECT NAME	HSAAP - KINGSPORT, TN	
TITLE	SWMU 18 SITE MAP 2018 LTM/LTO REPORT	
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-4

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-4 SWMU 18 Site Map 2018 LTM_LTO.mxd

AREAS OF BURIED UNMOVEABLE PIECES OF ASPHALT

EXISTING MONITORING WELL

SIGN SIGN

ELEVATION CONTOUR LINES

AREA WITH SEVERAL SMALL DEPRESSIONS (10/18/18)

APPROXIMATE SWMU 19/29 LANDFILL LIMITS/AREA OF RESTRICTED EXCAVATION

N
W E
S

0 100 200 Feet

0 30 60 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: Bing Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G S.M.	DATE	Bay West Customer-Focused Environmental & Industrial Solutions	
DRAWN T.P.	11/22/04		
REV. N.J.	11/06/18		
PROJECT NAME	HSAAP - KINGSPORT, TN		
TITLE	SWMU 19/29 SITE MAP 2018 LTM/LTO REPORT		
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-5	

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-5 SWMU 19_29 Site Map 2018 LTM_LTO.mxd

- VARIOUS BRICKS & ORANGE TERRA COTTA PIPE
- ABANDONED MONITORING WELL
- EXISTING MONITORING WELL
- SIGN
- SURFACE DRAINAGE WITH RIPRAP
- ACCESS ROAD (UNPAVED)
- DEBRIS OBSERVED (10/18/18)
- ROCK SLIDE
- APPROXIMATE SWMU 20 LANDFILL LIMITS

N
W E
S

0 75 150 Feet

0 20 40 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: Bing Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

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DRAWN T.P.	11/22/04	
REV. N.J.	11/06/18	
PROJECT NAME	HSAAP - KINGSPORT, TN	
TITLE	SWMU 20 SITE MAP 2018 LTM/LTO REPORT	
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-6

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-6 SWMU 20 Site Map 2018 LTM_LTO.mxd

ABANDONED MONITORING WELL

SIGN

DRAINAGE DITCH

BARE AREA RESTORED IN APRIL 2017 THAT REMAINS IN GOOD CONDITION

APPROXIMATE LIMITS OF 2003 USACHPPM COAL TAR REMOVAL

APPROXIMATE SWMU 26 LANDFILL LIMITS

N
W E
S

0 100 200 Feet

0 30 60 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: Bing Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

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REV. N.J.	11/06/18		
PROJECT NAME	HSAAP - KINGSPORT, TN		
TITLE	SWMU 26 SITE MAP 2018 LTM/LTO REPORT		
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-7	

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-7 SWMU 26 Site Map 2018 LTM_LTO.mxd

- ACM TRANSITE TILE
- COAL TAR REMOVED (04/01/18)
- COAL TAR REMOVED (10/18/18)
- LOCATION OF REMOVED SHEET METAL
- UTILITY MANHOLES/HATCHES
- SIGN
- LOCATION OF NEW FENCE LINE FOR EASTMAN ACCESS
- RAILROAD
- STANDING SURFACE WATER (10/18/18)
- AREA WITH ENCRUSTED COAL TAR
- APPROXIMATE SWMU 96 LANDFILL LIMITS

N
W E
S

0 60 120 Feet

0 20 40 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: Bing Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G S.M.	DATE	Bay West Customer-Focused Environmental & Industrial Solutions	
DRAWN T.P.	11/22/04		
REV. N.J.	11/06/18		
PROJECT NAME	HSAAP - KINGSPORT, TN		
TITLE	SWMU 96 SITE MAP 2018 LTM/LTO REPORT		
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-8	

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-8 SWMU 96 Site Map 2018 LTM_LTO.mxd

- COAL TAR REMOVED (04/01/18)
- CULVERT
- SIGN
- APPROXIMATE WATER LINE LOCATION
- CULVERT
- FENCE
- FORMER DITCH APPROXIMATE LOCATION
- LARGE MASS OF COAL TAR REMOVED (04/01/18)
- APPROXIMATE SWMU 103 LIMITS
- RAW WATER TANK

N
W E
S

0 50 100 Feet
0 15 30 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: Bing Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G S.M.	DATE	Bay West Customer-Focused Environmental & Industrial Solutions	
DRAWN T.P.	11/22/04		
REV. N.J.	11/06/18		
PROJECT NAME	HSAAP - KINGSPORT, TN		
TITLE	SWMU 103 SITE MAP 2018 LTM/LTO REPORT		
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-9	

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-9 SWMU 103 Site Map 2018 LTM_LTO.mxd

- 2003 SOIL SAMPLE LOCATIONS
- ABANDONED MONITORING WELL
- EXISTING MONITORING WELL
- MAY 1997 SURFACE SOIL SAMPLE LOCATIONS
- SIGN
- 10" PIPE
- DITCH
- FENCE
- STANDING SURFACE WATER - 03/26/18 (NOT OBSERVED ON 10/15/18)
- REPAIRED SWMU SIGN (04/03/18)
- AREA BARE OF VEGETATION (10/15/18)
- APPROXIMATE SWMU LIMITS
- AREA OF RESTRICTED EXCAVATION
- LIMIT OF EXCAVATIONS

N
W E
S

0 25 50
Feet
Meters
0 8 16

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: Bing Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G S.M.	DATE	Bay West Customer-Focused Environmental & Industrial Solutions	
DRAWN T.P.	11/22/04		
REV. N.J.	11/06/18		
PROJECT NAME	HSAAP - KINGSPORT, TN		
TITLE	SWMU 77/78/86/87 SITE MAP 2018 LTM/LTO REPORT		
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-10	

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-10 SWMU 77_78_86_87 Site Map 2018 LTM_LTO.mxd

ABANDONED MONTITORING WELL
EXISTING MONITORING WELL
UTILITY POLE
SIGN
DRAINAGE DITCH
GROUNDWATER FLOW DIRECTION
RAILROAD
APPROXIMATE SWMU 88 LIMITS
FILL SLOPE

N
W E
S

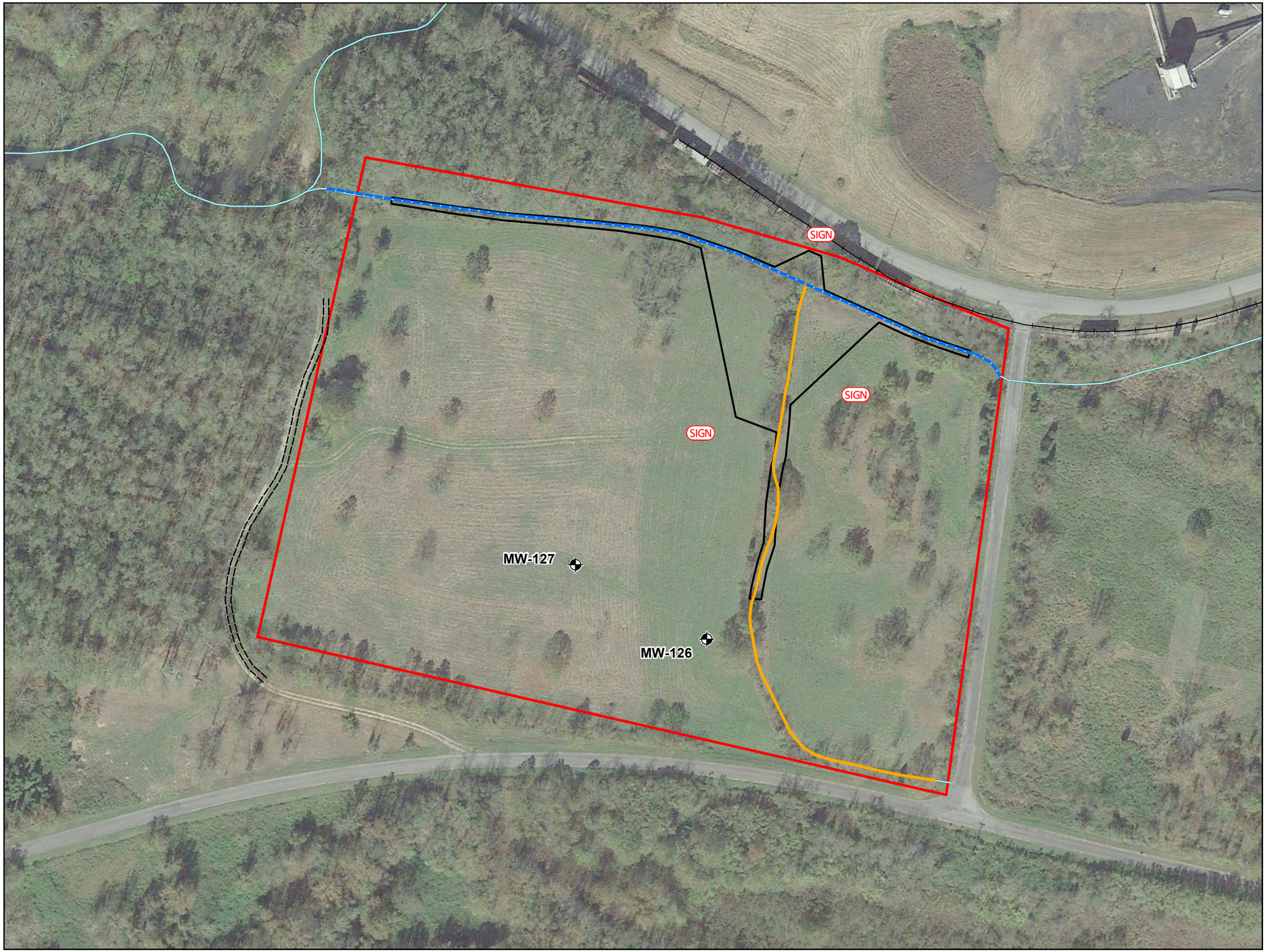
0 75 150 Feet
0 20 40 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: Bing Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G S.M.	DATE	Bay West Customer-Focused Environmental & Industrial Solutions	
DRAWN T.P.	11/22/04		
REV. N.J.	11/06/18		
PROJECT NAME	HSAAP - KINGSPORT, TN		
TITLE	SWMU 88 SITE MAP 2018 LTM/LTO REPORT		
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-11	

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-11 SWMU 88 Site Map 2018 LTM_LTO.mxd



SIGN LOCATION
MONITORING WELL
COOLING CHANNEL
DRAINAGE DITCH
RAILROAD TRACKS
GRAVEL ROAD
APPROXIMATE MAIN COOLING CHANNEL
AREA OF RESTRICTED EXCAVATION
LIMITS OF SWMU 109

N
W E
S

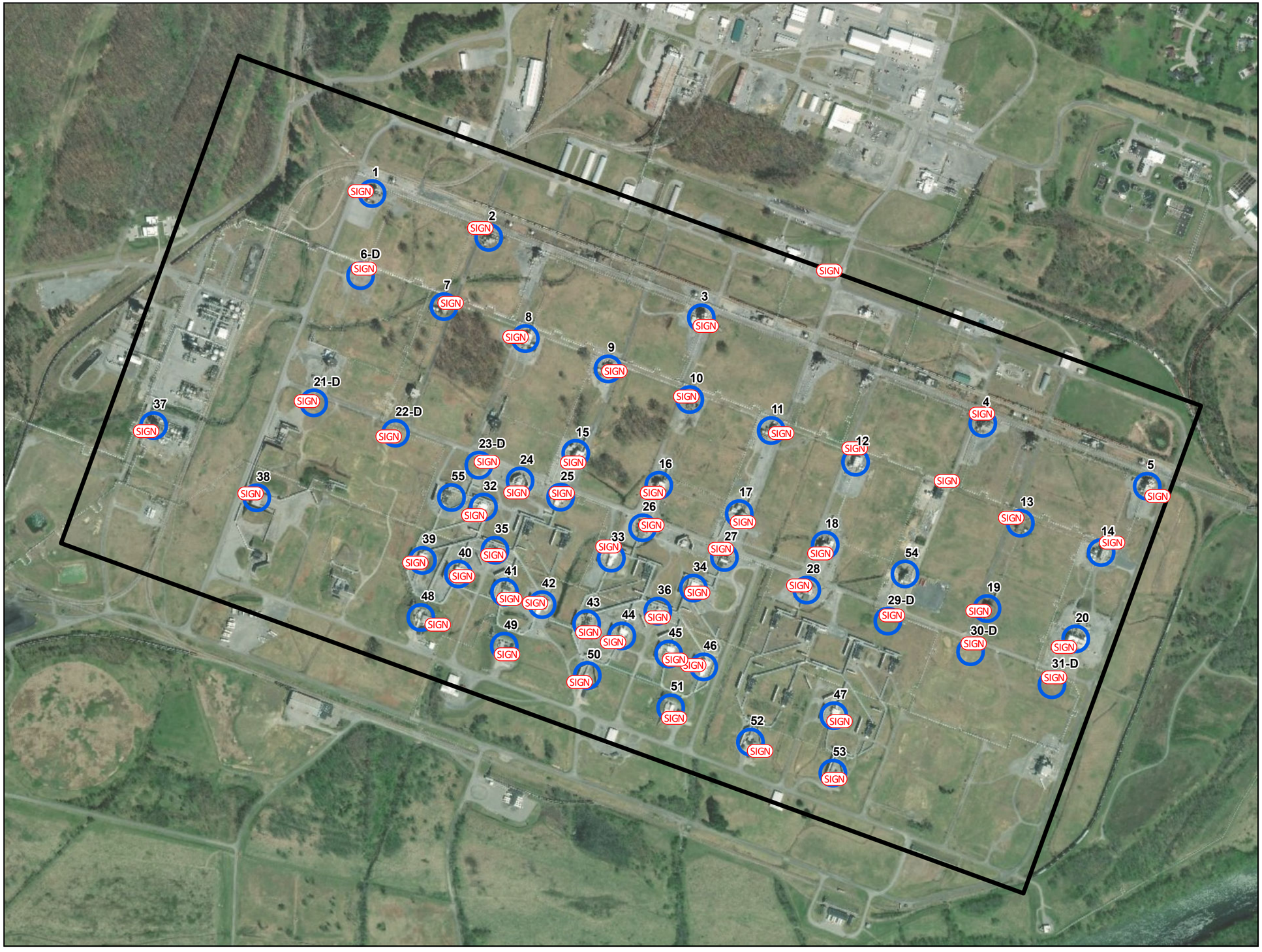
0 150 300 Feet
0 50 100 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: ESRI Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G S.M.	DATE	Bay West Customer-Focused Environmental & Industrial Solutions	
DRAWN T.P.	11/22/04		
REV. N.J.	11/06/18		
PROJECT NAME	HSAAP - KINGSPORT, TN		
TITLE	SWMU 109 SITE MAP 2018 LTM/LTO REPORT		
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-12	

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-12 SWMU 109 Site Map 2018 LTM_LTO.mxd



INSPECTED BUILDING

SIGN

APPROXIMATE SWMU 3 LIMITS

8 BUILDING NUMBER

D DEMOLISHED BUILDING

N
W E
S

0 600 1,200 Feet

0 200 400 Meters

Coordinate System: NAD83 StatePlane Tennessee FIPS 4100 Feet
Basemap: ESRI Aerial Imagery WMS

SOURCE:
US ARMY CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND

ENGR'G S.M.	DATE	Bay West Customer-Focused Environmental & Industrial Solutions	
DRAWN T.P.	11/22/04		
REV. N.J.	11/06/18		
PROJECT NAME	HSAAP - KINGSPORT, TN		
TITLE	SWMU 3 SITE MAP 2018 LTM/LTO REPORT		
DWG. NO. J160167 2017 FWO	SCALE AS SHOWN	FIGURE # 5-13	

Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_MOBILE\Holston_AAP\J160167\MapDocs\Basewide\005_2018_LTM_LTO\J160167 FIG 5-13 SWMU 3 Site Map 2018 LTM_LTO.mxd

APPENDIX A
GROUNDWATER PURGING AND SAMPLING LOGS

APPENDIX A.1
SUMMARY OF PRE-SAMPLING WATER LEVELS

Well ID	Location		Top of Casing Elevation	Spring 2018 Date	Depth to Water	Groundwater Elevation	Fall 2018 Date	Depth to Water	Groundwater Elevation	Groundwater Elevation Change Between Spring and Fall 2018
	Plant Area	SWMU/Source Area	(ft AMSL)		(ft BTOC)	(ft AMSL)		(ft BTOC)	(ft AMSL)	(ft)
GM-12	Area B	AOC-GW (downgradient of production area)	1,168.26	3/27/2018	7.57	1160.69	10/15/2018	10.84	1157.42	-3.27
GM-14	Area B	AOC-GW (downgradient of production area)	1,166.37	3/28/2018	7.48	1158.89	10/15/2018	10.63	1155.74	-3.15
MW-11	Area B	AOC-GW (downgradient of production area)	1,168.69	3/28/2018	3.62	1165.07	10/15/2018	4.11	1164.58	-0.49
MW-11B	Area B	AOC-GW (downgradient of production area)	1,168.57	3/28/2018	0.00	1168.57	10/15/2018	1.61	1166.96	-1.61
MW-48	Area B	Landfill Area - SWMUs 19/29	1,200.52	3/31/2018	32.12	1168.40	10/16/2018	36.71	1163.81	-4.59
MW-55	Area B	Landfill Area - Upgradient	1,307.71	4/4/2018	77.98	1229.73	10/15/2018	85.19	1222.52	-7.21
MW-68	Area B	Landfill Area - SWMU 20	1,184.83	3/31/2018	27.93	1156.90	10/16/2018	34.20	1150.63	-6.27
MW-70	Area B	SWMU 18	1,275.10	4/3/2016	29.99	1245.11	10/15/2018	34.61	1240.49	-4.62
MW-73	Area B	SWMUs 77/78/86/87	1,228.90	4/3/2018	4.49	1224.41	10/15/2018	6.38	1222.52	-1.89
MW-75	Area B	SWMUs 77/78/86/87	1,228.58	4/3/2018	4.23	1224.35	10/15/2018	6.27	1222.31	-2.04
MW-86	Area B	SWMU 88	1,241.26	4/3/2018	8.72	1232.54	10/15/2018	10.71	1230.55	-1.99
MW-91	Area B	AOC-GW (downgradient of production area)	1,171.57	3/29/2018	3.17	1168.40	10/15/2018	6.94	1164.63	-3.77
MW-91B	Area B	AOC-GW (downgradient of production area)	1,173.31	3/29/2018	3.32	1169.99	10/15/2018	6.61	1166.70	-3.29
MW-99	Area B	AOC-GW (production area)	1,209.22	4/4/2018	8.91	1200.31	10/15/2018	10.47	1198.75	-1.56
MW-101	Area B	AOC-GW (downgradient of production area)	1,177.17	3/27/2018	10.70	1166.47	10/15/2018	13.01	1164.16	-2.31
MW-101B	Area B	AOC-GW (downgradient of production area)	1,176.81	3/27/2018	10.50	1166.31	10/15/2018	12.70	1164.11	-2.20
MW-102	Area B	AOC-GW (downgradient of production area)	1,169.72	3/28/2018	5.09	1164.63	10/15/2018	10.74	1158.98	-5.65
MW-102B	Area B	AOC-GW (downgradient of production area)	1,169.49	3/28/2018	5.23	1164.26	10/15/2018	10.60	1158.89	-5.37
MW-104	Area A	SWMU 96	1,199.40	4/1/2018	8.17	1191.23	10/17/2018	8.61	1190.79	-0.44
MW-105	Area A	SWMU 96	1,200.08	4/1/2018	10.82	1189.26	10/17/2018	10.01	1190.07	0.81
MW-106	Area A	SWMU 96	1,201.00	4/1/2018	12.90	1188.10	10/17/2018	13.03	1187.97	-0.13
MW-107	Area A	SWMU 96	1,200.16	4/1/2018	7.33	1192.83	10/17/2018	7.05	1193.11	0.28
MW-114	Area B	Landfill Area - SWMUs 19/29	1,197.67	3/31/2018	28.85	1168.82	10/16/2018	37.89	1159.78	-9.04
MW-115	Area B	Landfill Area - SWMUs 19/29	1,193.65	3/31/2018	29.63	1164.02	10/16/2018	31.34	1162.31	-1.71
MW-116	Area B	Landfill Area - SWMUs 19/29	1,207.50	3/31/2018	50.58	1156.92	10/16/2018	57.67	1149.83	-7.09
MW-S1A	Area B	AOC-GW (downgradient of production area)	1,164.71	3/28/2018	4.31	1160.40	10/15/2018	6.15	1158.56	-1.84
STMW-15	Area B	SWMU 50 (downgradient of production area)	1,168.39	3/27/2018	11.06	1157.33	10/15/2018	13.66	1154.73	-2.60

APPENDIX A.2
GROUNDWATER PURGING AND SAMPLING LOGS
(SPRING AND FALL 2018)

SPRING 2018

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/27/18

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:

Hillary Oswald - BayWest DAT

Crystal Hann - Leidos DAT

Narrative (include time and location):

1125 Arrive at GM-12 location. PID: 0.0 ppm. Depth to water: 7.57 ft BTOC. Total well depth: 73.52 ft BTOC. Depth to water following pump placement: 7.28 ft BTOC

1142 Begin purging GM-12 with non-dedicated bladder pump. Troubleshoot settings before connecting to flow-through cell.

1147 Connect flow-through cell. Settings: 21 s fill, 9 s discharge, 30 psi

1155 First parameter reading - flow-through cell is full.

1202 Conduct well inspection.

1255 Collect CGWMW-G12-1011-GW for explosives - 2 1-liter unpreserved amber glass containers. Well is stable

1338 Done filling all bottleware. Pack up supplies.

1355 Depart GM-12 well location.

HO 3/27/18

Daily Weather Conditions: A.M. overcast, ~50°, mod. humidity, no breeze

P.M. mostly cloudy, ~60°, mod. humidity, slight breeze

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 03/27/18 TIME: 11 : 25

WELL ID NUMBER: GM-12 WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 53.73 ft. to 73.73 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82642

DEPTH TO WATER: 7.57 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 53.73 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~67 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10839

PURGE START TIME: 1142 PURGE END TIME: 1255

TOTAL VOLUME PURGED 3.50 liters

SITE CONDITIONS DURING PURGING: none noteable

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Water level dropped slowly but steadily until it stabilized after 45 mins of purging

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/27/18

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:

Hillary Oswald- Bay West DAT

Crystal Hann- Leidos DAT

Narrative (include time and location):

1440 Arrive at MW-101B location. PID: 0.1 ppm. Depth to water: 10.50 ft BTOC. Total well depth: 666.60 ft BTOC. Depth to water following pump placement: 10.50 ft BTOC.

1452 Begin purging well with non-dedicated bladder pump. Troubleshoot settings before connecting to flow-through cell.

1502 Connect to flow-through cell. Settings: 14 s fill, 6 s discharge, 30 psi @ 150 mL/min. First parameter reading at 1507.

1515 Conduct well inspection.

1547 Well is stable. Collect [CGWMW-101B-1008-GW] for explosives (2 1-liter unpreserved amber glass containers)

1602 Done filling all bottleware. Pack up supplies.

1625 Depart well location.

3/27/18

Daily Weather Conditions: A.M. N/A

P.M. ~65°, mostly cloudy, mod. humidity, slight breeze

Recorded By _____ QA Checked By _____

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant — **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 03/27/18 TIME: 14 : 40

WELL ID NUMBER: MW-101B WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 26.81 ft. to 63.81 ft.

INNER CASING: TYPE (PVC) ID: ~~2 inches~~ 4 inches
UPD 3/27/18

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82542

DEPTH TO WATER: 10.50 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 26.81 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 259 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10839

PURGE START TIME: 1452 PURGE END TIME: 1547

TOTAL VOLUME PURGED 8.50 L

SITE CONDITIONS DURING PURGING: water level easily stabilized - could purge at a faster rate

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none noteable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/28/18

Su M Tu (W) Th F Sa PAGE 1 OF 2

Task Team Members:

Hillary Oswald - BayWest

Crystal Hann - Leidos

Laura Peters - Army

DAT

Narrative (include time and location):

0830 Arrive at MW-11B location. PID: 0.0 ppm. Depth to water: 0.0 ft BTOC Total well depth: 62.70 ft BTOC (soft bottom). Depth to water following pump placement: 0.0 ft BTOC. Water column is just above TOC.

0846 Begin purging MW-11B with a non-dedicated bladder pump. Purge at a fast flow rate (300 mL/min) to try and clear out iron - have had issues with turbidity in the past. As it purges, I can see large chunks of orange iron discharging.

0850 Conduct well inspection.

0917 Connect to flow-through cell. Well purge water is significantly less turbid and do not see iron chunks. Settings: 21 s fill, 9 s discharge, 30 psi & 200 mL/min.

0922 First parameter reading.

1012 Well is stable. Collect CBGWMW-011B-1003-GW for

Daily Weather Conditions: A.M. ~57°, overcast/mostly cloudy, high humidity, no breeze

P.M. N/A

Recorded By Hillary Oswald QA Checked By

14

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/28/18

Su M Tu (W) Th F Sa PAGE 2 OF 2

Task Team Members:
Hillary Oswald - Bay West
Crystal Hann - Leidos
Laura Peters - Army DAT

Narrative (include time and location):

explosives (2 1-liter unpreserved amber glass bottles)
-Laura Peters collects sample ware for additional parameters.
1030 Done filling all bottles. Pack up supplies.
1055 Depart well location.

3/28/18

Daily Weather Conditions: A.M. ~60°, overcast/mostly cloudy, high humidity
P.M. N/A

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 03/28/18 TIME: 08 :30

WELL ID NUMBER: MW-11B WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 16.47 ft. to 63.47 ft.

INNER CASING: TYPE (PVC) ID: 2 inches (4 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E 82542

DEPTH TO WATER: 0.0 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 16.47 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~57.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10839

PURGE START TIME: 0846 PURGE END TIME: 1012

TOTAL VOLUME PURGED 20 liters

SITE CONDITIONS DURING PURGING: Purge at fast purge rate (300 mL/min) before collecting parameter readings to attempt to clear out iron-high turbidity readings.

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: well is an artesian well.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/28/18

Su M Tu (W) Th F Sa PAGE 1 OF 1

Task Team Members:
Hillary Oswald - BayWest
Crystal Hann - Leidos

Narrative (include time and location):

1115 Arrive at MW-S1A location. PID: 0.0 ppm. Depth to water: 4.31 ft BTOC. Total well depth: 16.79 Ft BTOC.

1127 Begin purging MW-S1A with the dedicated bladder pump. Settings: 26 s fill, 4 s discharge, 10 psi & 200mL/min - water is very turbid - let purge prior to connecting to flow-through cell.

1137 Connect to flow through cell. First parameter reading at 1142

1150 Conduct well inspection.

1242 Collect [CGWMW-S1A-1013-GW] for explosives (2 1-liter unpreserved ambers) - Well is stable.

1253 Done filling all bottleware. Pack up supplies & decon water level meter

1305 Conduct MW-S1B well inspection.

1310 Depart well location.

3/28/18

Daily Weather Conditions: A.M. N/A

P.M. ~62°, mostly cloudy, high humidity, very slight breeze

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 03/28/18 TIME: 11:15

WELL ID NUMBER: MW-51A WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 12.01 ft. to 17.01 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82542

DEPTH TO WATER: 4.31 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 12.01 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~ 14 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: dedicated

PURGE START TIME: 1127 PURGE END TIME: 1242

TOTAL VOLUME PURGED 15.5 liters

SITE CONDITIONS DURING PURGING: water level stabilizes easily at relatively fast flow rate

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none notable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/28/18

Su M Tu (W) Th F Sa PAGE 1 OF 1

Task Team Members:

Hillary Oswald - BayWest

Crystal Hann - Leidos

Narrative (include time and location):

1420 Arrive at MW-102B location. PID: 0.0ppm, ~~Tape~~ Depth to water: 5.23 ft BTOC. Total well depth: 49.27 ft BTOC. Depth to water following pump placement: 5.23 ft BTOC.

1434 Begin purging MW-102B with non-dedicated bladder pump - Troubleshoot settings before connecting to flow through cell.

1440 Connect to flow through cell. Settings: 13 s fill, 7 s discharge, 25 psi & 200 mL/min.

1444 First parameter reading

1450 Conduct well inspection.

1534 Well is stable. Collect [CBWMW-102B-1010-GW] for explosives (2 1-liter unpreserved amber glass bottles) Done filling all bottleware. Pack up supplies. to set up on MW-102

1540: Depart MW-102B

Daily Weather Conditions: A.M. N/A

P.M. 270°, mostly cloudy, high humidity, slight breeze

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 03/28/18 TIME: 14 : 20

WELL ID NUMBER: MW-102B WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 25.35 ft. to 49.85 ft.

INNER CASING: TYPE (PVC) ID: 2 inches 4 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82542

DEPTH TO WATER: 5.23 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 25.35 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~43 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10839

PURGE START TIME: 1434 PURGE END TIME: 1534

TOTAL VOLUME PURGED 11.5 L

SITE CONDITIONS DURING PURGING: water level stabilizes at relatively fast flow rate (200 mL/min)

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none notable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/28/18

Su M Tu (W) Th F Sa PAGE 1 OF 1

Task Team Members:
Hillary Oswald - BayWest
Crystal Hann - Leidos

CZR

Narrative (include time and location):
1545 Arrive at MW-102 location. PID: 0.0 ppm. Depth to water: 5.09 ft BTOC. Total well depth: 17.85 ft BTOC.
1550: Turn on pump
1555: Water level stable at 5.20 ft BTOC
14/6 15 psi. Begin filling cell
1620: Collect Sample CGWMW-102-1009-GW for explosives
Complete Sampling and turn off pump.
Depart location

DAT

Daily Weather Conditions: A.M. N/A
P.M. ~70°, mostly cloudy, high humidity, slight breeze

Recorded By Hillary Oswald. QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 3-28-18 TIME: 14:05

WELL ID NUMBER: MW-102 WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 8.00 ft. to 18.00 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: MP10-1848

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82542

DEPTH TO WATER: 5.09 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.00 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 14.00 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [✓] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 1550 PURGE END TIME: 1620

TOTAL VOLUME PURGED 4.5L

SITE CONDITIONS DURING PURGING: Wet ground

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Crystal Jum 3-28-18 QA CHECKED BY: _____

(Signature) (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/29/18

Su M Tu W (Th) F Sa PAGE 1 OF 1

Task Team Members:

Hillary Oswald - Bay West

DAT

DAT

Narrative (include time and location):

0920 Arrive at MW-91 location. PID: 0.0 ppm. Depth to water: 3.17 ft BTOC Total well depth: 16.20 ft BTOC (soft bottom). Depth to water following pump placement: 3.12 ft BTOC.

0934 Begin purging MW-91 with non-dedicated bladder pump. Troubleshoot settings prior to connecting to flow-through cell.

0937 Connect to flow-through cell. Settings: 15 s fill, 5 s discharge, 10 psi & 100 mL/min.

0944 First parameter reading.

0950 Conduct well inspection.

1039 Well is stable. Collect CGWMW-091-1004-GW for explosives (2 1-liter unpreserved amber glass bottles).

1100 Done filling all bottleware.

1120 Depart well location.

3/29/18

Daily Weather Conditions: A.M. ~57°, overcast, high humidity, no breeze

P.M. N/A

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 03/29/18 TIME: 09:20

WELL ID NUMBER: MW-91 WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 6.44 ft. to 16.44 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82542

DEPTH TO WATER: 3.17 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 6.44 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~11.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10839

PURGE START TIME: 0934 PURGE END TIME: 1039

TOTAL VOLUME PURGED 6.5 liters

SITE CONDITIONS DURING PURGING: none noteable

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: ground surface surrounding well is very wet / saturated

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/31/18

Su M Tu W Th F (Sa) PAGE 1 OF 2

Task Team Members:
Hillary Oswald - BayWest
Crystal Hann - Leidos

Narrative (include time and location):

0850 Arrive at MW-48 location. Depth to water: 32.12 ft BTOC PID: 0.0 ppm. Total well depth: 66.90 ft BTOC.
- Set up to hand bail well to dryness. Well historically cannot be low-flow sampled - water level will not stabilize.

0905 Begin hand bailing well to dryness.

0935 Bailed well to dryness. Removed ~30 liters. Will let well recharge before collecting samples.

0945 Conduct well inspection.

0950 Depart well location.

1555 Arrive at MW-48. Depth to water: 36.93 ft BTOC = sufficient volume to sample.

1600 Collect the following samples for SVOCs / low level PAHs (3 1-liter unpreserved amber glass bottles each) and RCRA Metals (1 500 mL HNO_3 poly bottle each):

Daily Weather Conditions: A.M. ~35°, clear/sun, mod. humidity, no breeze
P.M. ~60-65°, clear/sun, mod. humidity, slight breeze

Recorded By Hillary Oswald. QA Checked By

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/31/18

Su M Tu W Th F (Sa)

Task Team Members:
Hillary Oswald - BayWest
Crystal Hann - Leidos

DAT

Narrative (include time and location):

- CGWMW-048-0993-GW = 4 bottles
- CGWMW-048-0993-MS = 4 bottles
- CGWMW-048-0993-MSD = 4 bottles
- CGWMW-048-0994-QA = 4 bottles

} 16 bottles total. all with same time

1630 Done filling all bottleware. Install new absorbent sock.

1640 Collect CGWMW-048-SOCK-1036 for TCLP SVOCs (2 1-liter wide mouth jars, unpreserved.)

1650 Depart well location.

03/31/18

Daily Weather Conditions: A.M. N/A

P.M. ~60-65°, clear/sun, mod humidity, slight breeze

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 03/31/18

TIME: 08 : 50

WELL ID NUMBER: MW-48

WELL LOCATION: Old landfill / SWMU 19/29

DEPTH OF SCREENED INTERVAL(toc notch): N/A ft. to N/A ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 39082

TURBIDITY ID: N/A

DEPTH TO WATER: 32.12 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: N/A FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: N/A FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: (X) Bailer [ ] Bladder Pump [ ] Pump Type _____ PUMP ID: N/A

PURGE START TIME: 0905 PURGE END TIME: 0935

TOTAL VOLUME PURGED 30 liters

SITE CONDITIONS DURING PURGING: water remains clear throughout purging

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: well has strong odor - monitor breathing zone throughout purging - remains 0.0 ppm. Well historically cannot be low-flow sampled.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: (X) YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/31/18

Su M Tu W Th F (Sa) PAGE 1 OF 1

Task Team Members:
Hillary Oswald - BayWest
Crystal Hann - Leidos

Narrative (include time and location):

0950 Arrive at MW-115 location. PID: 0.0 ppm. Depth to water: 29.63 ft BTOC. Total well depth: 40.40 ft BTOC. Depth to water following pump placement = 29.58 ft BTOC.

1000 Begin purging MW-115 with non-dedicated bladder pump. Trouble shoot settings prior to connect flow-through cell.

1004 Connect to flow-through cell. Settings: 20 s fill, 10 s discharge, 20 psi & 40 mL/min.

1010 First parameter reading - flow-through cell is full.

1105 Well is stable. Collect CGWMW-115-0998-GW for SVOCs/low level PAHs (3-1-liter unpreserved amber glass bottles) and RCRA Metals (1-500 mL HNO_3 poly bottle) = 4 bottles total. Conduct well inspection.

1230 Done filling all bottles were. Pack up supplies.

1240 Depart well location.

03/31/18

Daily Weather Conditions: A.M. ~40°, clear/sun, mod. humidity, no breeze

P.M. N/A

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 03/31/18 TIME: 09:50

WELL ID NUMBER: MW-115 WELL LOCATION: Old Landfill / SWMU 29/29

DEPTH OF SCREENED INTERVAL(toc notch): 30.85 ft. to 40.85 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82542

DEPTH TO WATER: 29.63 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 30.85 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~35 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10839

PURGE START TIME: 1000 PURGE END TIME: 1105

TOTAL VOLUME PURGED 2-70 liters

SITE CONDITIONS DURING PURGING: water is very clear. Water level stabilizes fairly easily

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none noteable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/31/18

Su M Tu W Th F (Sa) PAGE 1 OF 2

Task Team Members:
Hillary Oswald - BayWest
Crystal Hann - Leidos

DAT

Narrative (include time and location):

1345 Arrive at MW-68 location. PID: 0.0 ppm. Depth to water: 27.93 ft BTOC. Total well depth: 43.42 ft BTOC.

1357 Begin purging MW-68 with the dedicated bladder pump. Trouble shoot settings prior to connecting to flow-through cell.

1403 Connect flow-through cell. Settings: 15 s fill, 5 s discharge, 20 psi & 150 mL/min.

1410 First parameter reading.

1412 Conduct well inspection.

1455 Well is stable. Collect the following samples for RDX, DNX, MNX, TNX (2 1-liter unpreserved amber glass bottles each) and RCRA Metals (1-500 mL HNO_3 poly bottle):

- CGWMW-068-1000-GW = 3 bottles
- CGWMW-068-1000-MS = 3 bottles
- CGWMW-068-1000-MSD = 3 bottles

Daily Weather Conditions: A.M. N/A

P.M. ~60-65°, clear/sun, mod. humidity, slight breeze

Recorded By Hillary Oswald QA Checked By

56

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 03/31/18

Su M Tu W Th F (Sa) PAGE 2 OF 2

Task Team Members:
Hillary Oswald - Bay West
Crystal Hann - Leidos

DAT

Narrative (include time and location):

- CGWMW-068-1008-QA = 3 bottles
- fill a total of 8 1-liter ambers & 4 500ml polys
- all samples have same time

1543 Done filling all bottleware. Pack up supplies.
1550 Conduct MW-68B well inspection.
1555 Depart well location.

03/31/18

Daily Weather Conditions: A.M. N/A

P.M. ~60-65°, clear/sun, mod humidity, slight breeze

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 03/31/18 TIME: 13:45

WELL ID NUMBER: MW-68 WELL LOCATION: Old Landfill / SWMU 20

DEPTH OF SCREENED INTERVAL(toc notch): 23.57 ft. to 43.57 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82542

DEPTH TO WATER: 27.93 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 23.57 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~36 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: N/A = dedicated

PURGE START TIME: 1357 PURGE END TIME: 1455

TOTAL VOLUME PURGED 8.75 liters

SITE CONDITIONS DURING PURGING: purge water is very clear; water level stabilizes quickly

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none notable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

Date (mm/dd/yy): 04/01/18

(Su) M Tu W Th F Sa PAGE 1 OF 1

Task Team Members:

Hillary Oswald - BayWest

Crystal Hann - Leidos

DAT

Narrative (include time and location):

0920 Arrive at MW-105 location. PID: 0.8 ppm. Depth to water: 10.82 ft BTOC. Total well depth: 18.95 ft BTOC.
- Set up to hand bail well to dryness. Well historically cannot be low-flow sampled - water level will not stabilize and drops rapidly.

0930 Begin hand bailing well.

0945 Bailed well to dryness after removing ~1/2 liters.
- Will let well recharge prior to sampling

0950 Conduct well inspection.

0955 Depart well location.

1300 Arrive back at well location. Check water level: 11.02 ft BTOC. Sufficient volume to sample.

1320 Collect COWMW-105-0988-GW for low level PAHs (2 1-liter unpreserved ambers) and VOCs (3-40 mL HCl VOA vials)

1337 Done filling bottles were. Pack up. Depart well location at 1335.

HDO 4/1/18

Daily Weather Conditions: A.M. ~50°, partly cloudy, mod. humidity, no breeze

P.M. ~60°, mostly cloudy, mod. humidity, slight breeze

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 04/01/18 TIME: 09:20

WELL ID NUMBER: MW-105 WELL LOCATION: Area A Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 9.43 ft. to 19.43 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: N/A

DEPTH TO WATER: 10.82 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.43 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: N/A FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [X] Bailer [ ] Bladder Pump [ ] Pump Type _____ PUMP ID: N/A

PURGE START TIME: 0930 PURGE END TIME: 0945

TOTAL VOLUME PURGED ~12 liters

SITE CONDITIONS DURING PURGING: water remains mostly clear throughout bailing

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: well historically cannot be low-flow sampled - dropping water level.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 04/01/18

(Su) M Tu W Th F Sa PAGE 1 OF 2

Task Team Members:
Hillary Oswald - Baywest
Crystal Hann - Leidos

DAT

Narrative (include time and location):

1000 Arrive at MW-107 location. PID: 0.0 ppm. Depth to water: 7.33 ft BTOC. Total well depth: 18.83 ft BTOC. Depth to water following pump placement: 7.48 ft BTOC.

1010 Begin purging well with non-dedicated bladder pump. Trouble-shoot settings before connecting to flow-through cell.

1014 Connect flow-through cell. First parameter reading at 1020. Settings: 14 s fill, 6 s discharge, 15 psi & 150 mL/min.

1120 Well is stable. Collect CGWMW-107-0990-GW for low level PAHs (2 1-liter unpreserved amber glass bottles) and VOCs (3-40 mL HCl VOA vials) = 5 bottles total. Also collect the following samples for VOCs (3-40mL HCl VOA vials each):

- CGWMW-107-0990-MS = 3 VOA vials
- CGWMW-107-0990-MSD = 3 VOA vials
- CGWMW-107-09991-QA = 3 VOA vials

1140 Done filling all bottleware. Pack up supplies.

Daily Weather Conditions: A.M. ~50°, mostly cloudy, mod. humidity, no breeze

P.M. ~60°, mostly cloudy, mod. humidity, slight breeze

Recorded By Hillary Oswald QA Checked By

68

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 04/01/18

(Su) M Tu W Th F Sa PAGE 2 OF 2

Task Team Members:
Hillary Oswald - BayWest
Crystal Hann - Leidos
DAT

Narrative (include time and location):

1150 Conduct well inspection.
1200 Depart well location.
1600 At Bldg 7 at Area B. Set up decon. station & decon. pump so equipment rinsate can be collected.
1620 Collect [COWMW-107-0992-ER] for VOCs (3-40mL HCl VOA vials).

04/01/18

Daily Weather Conditions: A.M. ~50°, mostly cloudy, mod. humidity, no breeze
P.M. ~60°, mostly cloudy, mod. humidity, slight breeze

Recorded By Hillary Oswald QA Checked By

GROUNDWATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 04/01/18 TIME: 10:00

WELL ID NUMBER: MW-107 WELL LOCATION: Area A Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 8.88 ft. to 18.88 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82542

DEPTH TO WATER: 7.33 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.88 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~13.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10839

PURGE START TIME: 1010 PURGE END TIME: 1120

TOTAL VOLUME PURGED ~~Water is fairly clear. Water lev~~ 4/1/18 10.50 L

SITE CONDITIONS DURING PURGING: Water is fairly clear. Water level stabilizes easily

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: no train or vehicle traffic during sampling.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

Date (mm/dd/yy): 04/03/18

Su M (Tu) W Th F Sa PAGE 1 OF 2

Task Team Members:
Hillary Oswald-BayWest
Crystal Hann-Leidos
Jasmine Stefansky-Leidos

Narrative (include time and location):

0840 Arrive at MW-73 location. PID: 0.0 ppm. Depth to water: 4.49 ft BTOC. Total well depth: 15.22 ft BTOC. Depth to water following pump placement:

0855 Begin purging with non-dedicated bladder pump. Trouble-shoot settings prior to connecting to flow-through cell.

0900 Connect to flow-through cell. Settings: 24s fill, 6s discharge, 10 psi & 125 mL/min. First parameter reading at 0905.

0935 Well is stable. Collect [CGWMW-073-1021-GW] for bromacil (2 1-liter unpreserved ambers) and pesticides (2 1-liter unpreserved ambers) = 4 bottles total.

1007 Done filling all bottle ware. Pack up supplies.

1010 Conduct well inspection.

1020 Depart well location. Head to Bldg 7 and decon. pump (# 10839).

Daily Weather Conditions: A.M. ~50-55°, overcast/cloudy, + RAIN high humidity, slight breeze

P.M. N/A

Recorded By Hillary Oswald QA Checked By

80

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 04/03/18

Su M (Tu) W Th F Sa PAGE 2 OF 2

Task Team Members:

Hillary Oswald - BayWest

Crystal Hann - Leidos

Jasmine Stefansky - Leidos

Narrative (include time and location):

1050 Collect equipment insate [CGWMW-073-1022-ER] off of pump 10839 for bromacil (2 1-liter unpreserved amber glass) & pesticides (2 1-liter unpreserved amber glass) = 4 bottles total.

04/03/18

Daily Weather Conditions: A.M. ~55°, cloudy, high humidity, slight breeze

P.M. N/A

Recorded By _____ QA Checked By _____

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 04/03/18 TIME: 08:40

WELL ID NUMBER: MW-73 WELL LOCATION: Admin

DEPTH OF SCREENED INTERVAL(toc notch): 6.50 ft. to 16.50 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82542

DEPTH TO WATER: 4.49 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 6.50 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~11.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10839

PURGE START TIME: 0855 PURGE END TIME: 0935

TOTAL VOLUME PURGED 5.0 liters

SITE CONDITIONS DURING PURGING: water remains clear, no odors. water level stabilizes quickly.

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Rain/drizzle during well purging but lets up when sampling.

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

Date (mm/dd/yy): 04/04/18

Su M Tu (W) Th F Sa PAGE 1 OF 1

Task Team Members:

Hillary Oswald - Bay West
Rich Kinsella - USACE
Crystal Hann - Leidos
Jasmine Stefansky - Leidos

Narrative (include time and location):

0900 Arrive at MW-55 location. PID: 0.0 ppm. Depth to water: 77.98 ft BTOC. Total well depth: 118.20 ft BTOC. Depth to water following pump placement: 77.35 ft BTOC.

0925 Begin purging MW-55 with non-dedicated bladder pump. Troubleshoot settings prior to connecting flow-thru cell.

0930 Connect to flow-through cell. Settings: 46s fill, 14s discharge, 55 psi & 50 mL/min.

0955 Collect [CGWMW-055-0995-GW] for SVOCs/low level PAHs (3-1-liter unpreserved amber glass bottles) & RCRA Metals (1-500mL HNO_3 poly bottle) = 4 bottles total. Well was stable.

1105 Done filling all bottleware. Conduct well inspection.
- Pack up supplies

1115 Depart well location.

04/04/18

Daily Weather Conditions: A.M. ~45°, partly cloudy, high humidity, strong breeze

P.M. N/A

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 04/04/18 TIME: 09:00

WELL ID NUMBER: MW-55 WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 107.72 ft. to 117.72 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: E82542

DEPTH TO WATER: 77.98 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 107.72 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~111 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10839

PURGE START TIME: 0925 PURGE END TIME: 0955

TOTAL VOLUME PURGED 1.50 liters

SITE CONDITIONS DURING PURGING: none notable

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none notable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: ~~YES~~ [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

Date (mm/dd/yy): 3-27-18

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:
Crystal Ham
Hilary Oswald

Narrative (include time and location):

1110 Arrive at site STMW-15. PID = 0.0 ppm
Initial water Level = 11.06 ft BTOC
Total depth = 32.18 ft BTOC
1115 Begin to set up pump.
1120 Turn on pump
1125: water leve stable @ 100 ml/min 20psi
20/110. Begin to fill flow through cell
1220: Collect sample CGWMW-515-1017-GW for VOCs + Explosives
CGWMW-515-1018-QA +
CGWMW-515-1017 MS/MSD for VOCs
1250: Complete Sampling and break down site
1258: Depart Location

Daily Weather Conditions: A.M. Cloudy 50°
P.M. Cloudy 60°

Recorded By Crystal Ham QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 3-27-18

TIME: 11:50

WELL ID NUMBER: STMW-15

WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 22.21 ft. to 32.21 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: 15127

WATER LEVEL INDICATOR ID: 41832

TURBIDITY ID: 4046007

DEPTH TO WATER: 11.06 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 22.21 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 27.21 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [✓] Bailer [ ] Bladder Pump [ ] Pump Type _____ PUMP ID: Dedicated

PURGE START TIME: 1120 PURGE END TIME: 1220

TOTAL VOLUME PURGED wet

SITE CONDITIONS DURING PURGING: GL

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: well is slightly open. Vegetation dead because spray around fence line

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 3-27-18

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:

Crystal Ham

Hillary Oswald

CJH

Narrative (include time and location):

0930 : Collect Source from Building 556.

COWMW-SRC-1030-SB for

Bromide, pesticides, SVOCs/PAHs, VOCs

explosives, metals

Collect associated trip blank for VOCs

COWMW-TB-1035-TB

CJH

Daily Weather Conditions: A.M. Cloudy 50-60°

P.M.

Recorded By Crystal Ham 3-27-18 QA Checked By [signature] 4-19-18

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 3-27-18

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:
Crystal Hann
Hillary Oswald

Narrative (include time and location):

1430: Arrive at MW-101 PID = 0.0 ppm
Initial water level = 10.70 ft BTOC
Total depth = 19.20 ft BTOC
1435: Begin to set up pump.
1455: Turn on pump
1500: Water level Stable at 10.70 ft BTOC
150 ml/min 11/9 20 psi
1555: Collect Sample CGWMW-101-1006-GW
for explosives + FD CGWMW-101-1007-QA
1630 ~~1630~~: Complete sampling begin to tear down site.
cdl 3-27-18
1650: Depart location

CDL
3-27-18

Daily Weather Conditions: A.M. ———
P.M. Partly cloudy 60°

Recorded By Crystal Hann QA Checked By [signature]

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 3-27-18

TIME: 15:10

WELL ID NUMBER: MW-101

WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 9.61 ft. to 19.61 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: 15127 cal 3-27-18

WATER LEVEL INDICATOR ID: ~~14852~~ 41832

TURBIDITY ID: 4046007

DEPTH TO WATER: 10.70 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.61 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 14.50 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [✓] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 1455 PURGE END TIME: 1555

TOTAL VOLUME PURGED 9.0 L

SITE CONDITIONS DURING PURGING: Grassy Field

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Work being conducted on steam pipes nearby

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Crystal Flum 3-27-18 (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

Date (mm/dd/yy): 3-28-18

Su M Tu (W) Th F Sa PAGE 1 OF 1

Task Team Members:
Crystal Hans
Hillary McOswald

cjh

Narrative (include time and location):

0830: Arrive at MW-11 PID = 0.0 ppm
Initial water level = 3.62 ft BTOC
Total depth = ~~17.6~~ 16.65 ft BTOC
0845: Begin to bail dry b/c this well will not low flow sample at 40 ml/min.
0850: Well purged dry. Allowing to recharge 3 gal.
0930: Collect sample CGWMW-011-1002-GW for explosives. Also collected L. Peters water samples.
0937: Waiting for L. Peters to arrive to collect her samples
1045: Depart Location

cjh

Daily Weather Conditions: A.M. Cloudy 60°

P.M. —

Recorded By: Crystal Hans QA Checked By: [signature]

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 3-28-18

WELL ID NUMBER: MW-11 TIME: 09:00

DEPTH OF SCREENED INTERVAL(toc notch): 8.00 ft. to 18.00 ft. WELL LOCATION: Boundary

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 41832

TURBIDITY ID: 4046007

DEPTH TO WATER: 362 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.00 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: NA FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [✓] Bailer [ ] Bladder Pump [ ] Pump Type _____ PUMP ID: NA

PURGE START TIME: 0845 PURGE END TIME: 0850

TOTAL VOLUME PURGED 3 gal

SITE CONDITIONS DURING PURGING: Ground is wet

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Crystal Elm (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 3-28-18

Su M Tu (W) Th F Sa PAGE 1 OF 1

Task Team Members:

Crystal Ham

Hillary Oswald

Narrative (include time and location):

1100 Arrive at GM-14 PID = 0.8 ppm

Initial water level: 7.48 ft BTOC

Total depth = 47.43 ft BTOC (Soft)

1115: After setting up equipment, turn on pump

1120: Stable at water level of 7.62 ft BTOC

500 ml/min 10/9 20 psi. Begin to fill cell

1150: Collect sample CGWMW-GM14-1012-GW for explosives

1240: Complete sampling. Begin to tear down equipment.

1250: Depart location and waiting on security to let me through the gate.

CSH

Daily Weather Conditions: A.M. Cloudy 70°

P.M. Cloudy 70°

Recorded By [signature] QA Checked By [signature]

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 03/28/18

WELL ID NUMBER: ~~MW~~ GM-14 (CK3-2-18)

TIME: 11:25

WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 27.31 ft. to 47.31 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: 15127

WATER LEVEL INDICATOR ID: 41832

TURBIDITY ID: 4046007

DEPTH TO WATER: 7.48 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: ~~37.00~~ 27.31 (CK3-28-18) FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 37.00 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [✓] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 1115 PURGE END TIME: 1150

TOTAL VOLUME PURGED 1.75L

SITE CONDITIONS DURING PURGING: Grassy field (tall)

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Crystal Jem 3-28-18 (Signature) QA CHECKED BY: [signature] 4-19-18 (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 3-29-18

Su M Tu W (Th) F Sa PAGE 1 OF 1

Task Team Members:

Crystal Hann

Hillary Oswald

Narrative (include time and location):

0920: Arrive at MW-91B PID = 0.0 ppm
Initial water level = 3.32 ft BTOC
Total depth = 43.96 ft BTOC soft

0940: Turn on pump. problem with pump seal

1015: Pump is now ok. 50 ml/min. 5416
30 psi. 3.52 ft BTOC

1040: Continue to have trouble with the pump
Replaced O-Ring..

1050: Turn on pump again.

1130: Collect Sample CGWMW-091B-1005-GW
for explosives.

1215 Complete sampling.

1220 Depart Location

Daily Weather Conditions: A.M. Cloudy 66° - 70°

P.M. —

Recorded By Crystal Hann QA Checked By [signature]

GROUNDWATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 03-29-18

TIME: 10 : 05

WELL ID NUMBER: MW-91B

WELL LOCATION: Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 23.15 ft. to 43.15 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: 15127

WATER LEVEL INDICATOR ID: 41832

TURBIDITY ID: 4046007

DEPTH TO WATER: 3.32 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 23.15 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 33.00 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [✓] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 0940 PURGE END TIME: 1130

TOTAL VOLUME PURGED 2.75

SITE CONDITIONS DURING PURGING: Very wet ground

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 3-31-18

Su M Tu W Th F (Sa) PAGE 1 OF 1

Task Team Members:
Crystal Hann
Hillary Oswald

CH

Narrative (include time and location):

0850: Arrive at MW-114 PID = 0.0 ppm
Initial water level 28.85 ft BTOC
Total depth ~~103.20~~ 104.65 ft BTOC (soft) CH 3-31-18

0900: Begin to set up pump.

0915: Turn on pump

0945: Well stable at 40 ml/min 60 psi: ~~15~~ CH 3-31-18

~~1040~~ CH 3-31-18 5119.

1040: Collect sample CGWMW-114-0996-GW for SVOCs/PAHs + metals

1200 Complete sampling and begin to tear down equipment.

1215: Depart location to decon equipment for next well. Have to wait for security.

1259: Collect Rinsate CGWMW-114-0997-FB for SVOCs/PAHs + metals

Daily Weather Conditions: A.M. Sunny 60°

P.M. Sunny 65°

Recorded By Crystal Hann QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 3-31-18 TIME: 10 : 20

WELL ID NUMBER: MW-114 WELL LOCATION: Old Land Fill

DEPTH OF SCREENED INTERVAL(toc notch): 95.87 ft. to 105.87 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: 15127

WATER LEVEL INDICATOR ID: 41832

TURBIDITY ID: 4046007

DEPTH TO WATER: 28.85 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 95.87 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 100.00 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [✓] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 0915 PURGE END TIME: 1040

TOTAL VOLUME PURGED 3.4 L

SITE CONDITIONS DURING PURGING: Wet ground

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Crystal Hunt 3-31-18 QA CHECKED BY: [signature] 4-19-18

(Signature) (Signature)

4h

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 3-21-18

Su M Tu W Th F (Sa) PAGE 1 OF 1

Task Team Members:
Crystal Ham
Hillary Oswald

Narrative (include time and location):

1345: Arrive at MW-116 PID = 0.0 ppm
Initial water level = 50.58 ft BTOC
Total depth = 121.89 ft BTOC (off)
1350: Begin to set up pump.
1405: Turn on pump
1415: Water level stable at 50.70 ft BTOC
40 ml/min 2218 60 psi. Begin to fill cell
1500: Collect sample CGWMW-116-0999-GW for PAHs/SVOCs + metals
1632 Complete sampling and begin to teardown setup
1648 Depart location

Daily Weather Conditions: A.M. ~~Sunny 65~~ cdl 3-31-18
P.M. Sunny 65

Recorded By Crystal Ham QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 3-31-18 TIME: 14:30

WELL ID NUMBER: MW-116 WELL LOCATION: Old Landfill

DEPTH OF SCREENED INTERVAL(toc notch): 99.80 ft. to 119.80 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: 15127

WATER LEVEL INDICATOR ID: 41832

TURBIDITY ID: 4046007

DEPTH TO WATER: 50.58 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 99.80 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 109.8 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [✓] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 1405 PURGE END TIME: 1500

TOTAL VOLUME PURGED 2.2L

SITE CONDITIONS DURING PURGING: Wet ground

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

Date (mm/dd/yy): 4-1-18

(Su) M Tu W Th F Sa PAGE 1 OF 1

Task Team Members:
Crystal Ham
Hillary McGowen

Narrative (include time and location):

0920: Arrive at MW-104. PID = 0.0 ppm
0925: Initial water level = 8.17 ft BTOC
Total Depth = 18.80 ft BTOC
0930: Begin to set up pump.
0940: Turn on pump
0950: Water level stable at 8.32 ft BTOC.
80 ml/min 20 psi 12 l/s. Begin to fill up cell
1025: Collect Sample CGWMW-104-0987-GW for VOCs + ~~SVOCs~~ PAHs via 4-1-18. Collect associated Trip Blank CGWMW-TB-1034-TB.
1120: Complete Sampling. Depart Location

Daily Weather Conditions: A.M. Cloudy ~50°
P.M.

Recorded By Crystal Ham QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 04-01-18

TIME: 09:45

WELL ID NUMBER: MW-104

WELL LOCATION: Area A Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 8.95 ft. to 18.95 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: 15127

WATER LEVEL INDICATOR ID: 41832

TURBIDITY ID: 4046007

DEPTH TO WATER: 8.17 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.95 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 13.00 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [✓] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 0940 PURGE END TIME: 1025

TOTAL VOLUME PURGED 4.42

SITE CONDITIONS DURING PURGING: None

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: Acid smell is strong now that Eastman is using Area A

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Crystal Hunt (Signature) QA CHECKED BY: [signature] (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

Date (mm/dd/yy): 9-1-18

(Su) M Tu W Th F Sa PAGE 1 OF 1

Task Team Members:

Crystal Hunn

Hillary Oswald

Narrative (include time and location):

1315: Arrive at MW-106. PID = 0.0 ppm
Initial Water Level: 12.90 ft BTOC
Total depth = 19.20 ft BTOC
1320: Begin to set up pump. 1330: Turn on pump
1335 water level stable at 12.91 ft BTOC
50 ml/min 20 psi 20/10. Begin to
fill flow through cell
1415: Collect sample GWMW-106-0989-GW
for PAHs + VOCs
1458: Complete sampling and tear down
equipment
1502: Depart Location

CH

Daily Weather Conditions: A.M. —

P.M. Cloudy - 60°

Recorded By Crystal Hunn QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 4-1-18 TIME: 13:45

WELL ID NUMBER: MW-106 WELL LOCATION: Area A

DEPTH OF SCREENED INTERVAL(toc notch): 9.54 ft. to 19.54 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: 15127

WATER LEVEL INDICATOR ID: 41832

TURBIDITY ID: 4046007

DEPTH TO WATER: 12.90 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.54 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 15.00 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [✓] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 1330 PURGE END TIME: 1415

TOTAL VOLUME PURGED 2.25 L

SITE CONDITIONS DURING PURGING: New gravel near well

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

Date (mm/dd/yy): 4-3-18

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:

Crystal Hunn

Hillary Oswald

Jasmine Stefanisky

CH

Narrative (include time and location):

0850 Arrive at MW-75. PID = 0.0 ppm
Initial water level = 4.23 ft BTOC
Total depth = 15.20 ft BTOC Soft
0900: Begin to bail dry.
0910: Well purged dry.
0915: Depart location to allow well to recharge
1005: Arrive back at MW-75.
1015: Collect sample CGWMW-075-1023-GW for pesticides + Bromacil. Also collected associated MS/MSD CGWMW-075-1023-MS/MSD CGWMW-075-1024-QA for pesticides + bromacil
1055: Depart Location

Daily Weather Conditions: A.M. Cloudy 50°

P.M.

Recorded By Crystal Hunn QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 4-3-18

TIME: 09 : 15

WELL ID NUMBER: ~~MW-86~~ 4-3-18 MW-75

WELL LOCATION: Admin

DEPTH OF SCREENED INTERVAL(toc notch): 5.50 ft. to 15.50 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 41832

TURBIDITY ID: NA

DEPTH TO WATER: 4.23 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 5.50 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: NA FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [✓] Bailer [ ] Bladder Pump [ ] Pump Type _____ PUMP ID: NA

PURGE START TIME: 0900 4-3-18

PURGE END TIME: 0910

TOTAL VOLUME PURGED ~~3.5 gal~~ 2.5 gal

SITE CONDITIONS DURING PURGING: Rain & Muddy

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature)

QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 4-3-18

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:
Crystal Ham
Hillary Oswald
Jasmine Stefansky

Narrative (include time and location):

0925: Arrive at MW-86. PID = 0.0 ppm
Initial water level = 8.72 ft BTOC
Total Depth = 19.60 ft BTOC
0948: Begin to purge dry
0955: Well purged dry ~~3.0 gal~~ 2.0 gal
1000: Depart location to allow well to recharge.
1059: Arrive back to collect sample
1110: Collect CGWMW-086-1025-GW for pesticids + bromacil
11:20 Depart location

Daily Weather Conditions: A.M. Cloudy 55°
P.M.

Recorded By Crystal Ham QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO:** CK01

DATE (mm/dd/yy): 4-3-18 TIME: 09:46

WELL ID NUMBER: MW-86 WELL LOCATION: Admin

DEPTH OF SCREENED INTERVAL(toc notch): 9.91 ft. to 19.91 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: NA

WATER LEVEL INDICATOR ID: 39082

TURBIDITY ID: NA

DEPTH TO WATER: 8.72 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.91 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: NA FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [✓] Bailer [ ] Bladder Pump [ ] Pump Type _____ PUMP ID: NA

PURGE START TIME: 0948 PURGE END TIME: 0955

TOTAL VOLUME PURGED 2.0 gal

SITE CONDITIONS DURING PURGING: low grass. Rain

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [✓] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Crystal Flum (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 4/3/16

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:
Hillary Oswald
Crystal Hann
Jasmine Stefonsky

Narrative (include time and location):
1200 arrive at well MW70 PID 0.0ppm
1205 initial water level 29.99ft
Total Depth 53.10ft
1210 Begin to set up sampling equipment
1220 turned on pump
1235 Water level Stable at 28.40 at 50mL per min
settings are 23psi, S6R, 4D.
Begin to fill Workbook 1235
1325 took sample CGWMW070 1020 GW for
Mercury analysis
1400: Depart location

Daily Weather Conditions: A.M. _____

P.M. Cloudy 68°

Recorded By Crystal Hann QA Checked By _____

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 4/13/16

TIME: 12 : 00

WELL ID NUMBER: MW70 ~~4/13/16~~ WELL LOCATION: SWMU 18 Source

DEPTH OF SCREENED INTERVAL(toc notch): ~~52.50~~ ft. to _____ ft. 42.50 → 52.50 ft

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: 15127

WATER LEVEL INDICATOR ID: 39082

TURBIDITY ID: 4046007

DEPTH TO WATER: 29.99 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 42.50 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 42.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: Dedicated

PURGE START TIME: 1235 PURGE END TIME: 1320

TOTAL VOLUME PURGED 3.25L

SITE CONDITIONS DURING PURGING: None

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: None

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 4/4/18

Su M Tu (W) Th F Sa PAGE 1 OF 1

Task Team Members:
Crystal Hann
Jasmine Stefanski
Hillary Oswald

Narrative (include time and location):
0840 Arrive at well MW-99 PID = 0.0ppm
Initial water level = 8.91 ft BTOC
Total depth = 18.40 ft BTOC
0850 Turned pump on
0905 Water level stable at 8.98, settings 11R, 9D, 15FS.
purge rate is 100mL/mn
0905 allowing to purge, without readings - turbidity is very high
0920 Began to fill up flow thru cell on Horiba
0935 Began taking readings
1015 TOK Sample CAWMW099T1014GW for explosives, mnx, tnx, DNX Analysis +MS/MSD + FDCAWMW-099-1015-QA
1140: Complete Sampling
1155: Depart Location

Daily Weather Conditions: A.M. Sunny, 40°F
P.M.

Recorded By Crystal Hann QA Checked By

FALL 2018

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/16/18

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:

ANDREW STEFFE - LYDOS

HILLARY OSWALD - BAYWEST

10/16/18

Narrative (include time and location):

0900 - ARRIVED AT AREA B FORMER QUARRY. BEGIN SETTING UP ON MW-68. TOOK PID MEASUREMENT AT WELLHEAD (PID 10/16/18 MINIRAE 3000 # 82764). PID = 0.0 ppm

0940 - STARTED PURGE AT MW-68.

1025 - STARTED COLLECTING SAMPLES AT MW-68, CBWMW-068-1025-GW

1100 - FINISHED COLLECTING ALL BOTTLES FOR MW-68 SAMPLE, PACKED UP EQUIPMENT & HEADED TO MW-48 TO START HAND BAILING.

10/16/18

Daily Weather Conditions: (A.M) 0900 : CLOUDY, LIGHT MIST, 57°F, CALM

P.M. _____

Recorded By ANDREW STEFFE QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 10/16/18 TIME: 09 : 35

WELL ID NUMBER: MW-68 WELL LOCATION: BOUNDARY / FORMER QUARRY

DEPTH OF SCREENED INTERVAL(toc notch): 23.57 ft. to 43.57 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: SOLINST 100, 39350

TURBIDITY ID: # 34027

QED CONTROLLER SETTINGS:
PRESSURE @ 20 psi
REFILL @ 22.0
DISCHARGE @ 8.0
CPM = 2.0

DEPTH TO WATER: 34.20 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 23.57' FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 38.65' FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: # 10839

PURGE START TIME: 0940 PURGE END TIME: 1025

TOTAL VOLUME PURGED 9.9 LITERS

SITE CONDITIONS DURING PURGING: USED DEDICATED PUMP

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: NONE NOTABLE

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Cindy Still 10/16/18 QA CHECKED BY: _____

(Signature) (Signature)

4

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/16/18

Su M (Tu) W Th F Sa PAGE 1 OF 2

Task Team Members:

ANDREW STUFFE - LEIDOS

HILLARY OSWALD - BAY WEST

10/16/18

Narrative (include time and location):

1120 - ARRIVED AT MW-48 LOCATION. TOOK WELLHEAD READING W/PID (~~0.0 ppm~~) 10/16/18

READING = 0.3 ppm. DTW = 36.71' btoc

1135 - STARTED HAND BAILING MW-48

1215 - FINISHED HAND BAILING - MW-48 PACKED UP EQUIPMENT, BREAK FOR LUNCH.

1240 - HEADED TO MW-116.

1600 - RETURNED FROM SAMPLING MW-116. DTW = 40.20' - sufficient volume to sample

1610 Collect CGWMW-048-SOCK-1016 for TCLP SVOCs (1-32oz unpreserved wide mouth jar) = 1 jar total.

1620 Collect the following samples:

- CGWMW-048-1044-GW
- CGWMW-048-1044-MSD
- CGWMW-048-1044-MS
- CGWMW-048-1045-DA

-collect all samples for SVOCs/low level PAHs (3-1-liter unpreserved ambers each) and RCRA Metals (1-500

Daily Weather Conditions: (A.M) 60°F, CLOUDY, CALM

(P.M.) SAME

Recorded By ANDREW STUFFE / Hillary Oswald Checked By

8

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/16/18

Su M (Tu) W Th F Sa PAGE 2 OF 2

Task Team Members:

ANDREW STEFFE - LEIDOS

HILLARY OSWALD - BAY WEST

10/16/18

Narrative (include time and location):

mL HNO_3 poly each) = 4 bottles total

- fill total of 12 1-liter ambers & 4 500mL polys = 16 bottles total

1650 Done filling all bottleware. Install new sorbent sock.

1655 Depart Hill location

10/16/18

Daily Weather Conditions: A.M. _____

P.M. ~62°F, cloudy, calm

Recorded By Andrew Steffe QA Checked By _____

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 10/16/18 TIME: 11:35

WELL ID NUMBER: MW-48 WELL LOCATION: MW-48, BOUNDARY

DEPTH OF SCREENED INTERVAL(toc notch): _____ ft. to _____ ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 39350

TURBIDITY ID: 34027

DEPTH TO WATER: 36.71' FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: _____ FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: _____ FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [X] Bailer [ ] Bladder Pump [ ] Pump Type _____ PUMP ID: Bailed

PURGE START TIME: 1135 PURGE END TIME: 1215

TOTAL VOLUME PURGED ~3.5 GALLONS

SITE CONDITIONS DURING PURGING: NONE NOTABLE

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: NONE NOTABLE

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Andrew Stuffle 10/16/18 QA CHECKED BY: _____

(Signature) (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/16/18

Su M (Tu) W Th F Sa PAGE 1 OF 1

Task Team Members:

ANDREW STEFFE - LEIDOS

HILLARY OSWALD - BAY WEST

Narrative (include time and location):

1245 - ARRIVED AT MW-116. TOOK PID READING FROM WELLHEAD (0.0 ppm).

DTW = 57.47'

~~1330~~ 1410

1320 - STARTED PURGING WELL. HOWEVER, TOOK AWHILE TO GET CORRECT SETTINGS ON PUMP CONTROLLER TO GET WATER TO COME UP TUBING

1335 - STARTED PURGING WATER

1415 - STARTED COLLECTING SAMPLE FOR MW-116. FILLING BOTTLE WARE.

1515 - FINISHED COLLECTING SAMPLES FOR MW-116. CBWMW-116-1049-GW

DUMPED OFF WELL LOCATION & HEADED BACK TO FORMER FIRE STATION

10/16/18

Daily Weather Conditions: (A.M.) 10/16/18

P.M. 61°F, CLOUDY, CALM

Recorded By ANDREW STEFFE QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 10/16/18

TIME: ~~1255~~ 1257 10/16/18

WELL ID NUMBER: MW-116

WELL LOCATION: BOUNDARY / FORMER QUARRY

DEPTH OF SCREENED INTERVAL(toc notch): 99.80' ft. to 119.80' ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 39350

TURBIDITY ID: A 34027

Pump CONTROLLER SETTINGS:
PRESSURE @ 65 psi
DISCHARGE = 16.0
REGUL @ 44.0
CPM = 1.0

DEPTH TO WATER: 57.47' FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 99.80 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~109.8' FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: # 10859

PURGE START TIME: 1335

PURGE END TIME: ~~1505~~ 1505 10/17/18 1415

TOTAL VOLUME PURGED 2.2 L

SITE CONDITIONS DURING PURGING: NONE NOTED

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: NONE NOTED

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Andrew Stiller (Signature) 10/16/18 QA CHECKED BY: _____ (Signature)

16

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/17/18

Su M Tu (W) Th F Sa PAGE 1 OF 2

Task Team Members:

ANDREW STEFFE - LEIDOS

HILLARY OSWALD - BAY WEST

10/17/18

Narrative (include time and location):

0829 - ARRIVED AT AREA A, WELL LOCATION MW-105. CHECKED HEADSPACE (0.9 ppm). DTW = 10.01' BTOC, TD = 18.75'

~~0855 - FID~~

0837 - STARTED HAND BAILING MW-105.

0855 - FINISHED BAILING MW-105 DUE TO GOING DRY. BAILED ~4 GALS FROM WELL.

0901 - DEMOB'D OFF LOCATION & HEADED TO NEXT WELL LOCATION MW-107.

1130 - RETURNED TO CHECK WL & SAMPLE MW-105. WL @ 12.49' BTOC, STARTED FILLING OUT LABELS & PREPPING BOTTLES. WL NEEDS TO BE A 12.20' BTOC BEFORE CAN SAMPLE.

1200 - WATER LEVEL @ 12.2' BTOC. STARTED SAMPLING MW-105

1215 - FINISHED SAMPLING MW-105. HEADED BACK TO FIRE HALL TO DECON PUMP & COLLECT RINSATE SAMPLE.

1320 - COLLECTED MW-107 EQUIPMENT RINSATE.

1330 - MOB'D TO IDW STORAGE AREA TO DITUM GENERATED IDW.

Daily Weather Conditions: (A.M.) CLOUDY, 52° F, SLIGHT BREEZE

P.M. _____

Recorded By ANDREW STEFFE QA Checked By

20

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/17/18

Su M Tu (W) Th F Sa PAGE 2 OF 2

Task Team Members:

ANDREW STEFFE - LEIDOS

HILLARY OSWALD

10/17/18

Narrative (include time and location):

1400 - COLLECTED IDW WATER SAMPLE COMPOSITE FROM 3 DRUMS (2 DRUMS FROM SPRING 2018 + 1 DRUM FROM FALL 2018).

10/17/18

1420 - HEADED TO GRAB ICE, THEN TO COLLECT POTABLE WATER SOURCE SAMPLE.

1435 - COLLECTED POTABLE WATER SOURCE SAMPLE CGWMW-SRC-1052-SB

10/17/18

Daily Weather Conditions: A.M.

P.M. CLOUDY, 55°F, SLIGHT BREEZE

Recorded By Andrew Steffe QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 10/17/18 TIME: 08 : 29

WELL ID NUMBER: MW-105 WELL LOCATION: _____

DEPTH OF SCREENED INTERVAL(toc notch): 9.43 ft. to 19.43 ft.

INNER CASING: TYPE PVC ID: 2 inches

PURGE SAVER ID: N/A JS 1731 18

WATER LEVEL INDICATOR ID: ~~N/A~~ 39350

TURBIDITY ID: N/A

DEPTH TO WATER: 10.01 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.43 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: N/A FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [X] Bailer [ ] Bladder Pump [ ] Pump Type _____ PUMP ID: Bailer

PURGE START TIME: 0837 PURGE END TIME: 0855

TOTAL VOLUME PURGED ~ 4 GALS

SITE CONDITIONS DURING PURGING: NONE NOTED

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: NONE NOTED

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: Andrew Stuff 10/17/18 QA CHECKED BY: _____

(Signature) (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/17/18

Su M Tu (W) Th F Sa PAGE 1 OF 1

Task Team Members:

ANDREW STEFFE - LEIDOS

HILLARY OSWALD - BAY WEST

JSH 7/18

Narrative (include time and location):

0910 - ARRIVED AT MW-107 LOCATION. MEASURED WITH HORIBA (0.0 ppm).
WL @ 7.05' BTOC. TD = 18.88'

0944 - STARTED PURGING WITH MW-107 @ 178 mL/min.

~~1045 - FINISHED SAMPLING~~ AS 10/17/18

1024 - STARTED SAMPLING MW-107.

1045 - FINISHED COLLECTING BOTTLES FOR MW-107. PACKED UP EQUIPMENT & MOBED BACK TO MW-105 TO SAMPLE.

AS 10/17/18

Daily Weather Conditions: (A.M) SUNNY, MILD, 55°F, SLIGHT BREEZE

P.M. _____

Recorded By Andrew Steffe QA Checked By JSH

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 10/17/18 TIME: 09 : 20

WELL ID NUMBER: MW-107 WELL LOCATION: AREA A

DEPTH OF SCREENED INTERVAL(toc notch): 9.88 ft. to 19.88 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 08558

TURBIDITY ID: 34027

DEPTH TO WATER: 7.05 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.88 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 14.88 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type BLADDER - STAINLESS STEEL PUMP ID: 10839

PURGE START TIME: 0944 PURGE END TIME: 1024

TOTAL VOLUME PURGED 6.8 L

SITE CONDITIONS DURING PURGING: NONE NOTED

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: NONE NOTED

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY:

RECORDED BY: Andrew Stiff QA CHECKED BY:

(Signature) (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/16/18

Su M (Tu) W Th F Sa PAGE 1 OF 2

Task Team Members:
Hillary Oswald - Bay West
Andy Steffe - Leidos

10/16/18

Narrative (include time and location):

0855 Arrive at MW-115 location. PID = 0.0 ppm. Depth to water = 31.34 ft BTOC. Total well depth = 40.38 ft BTOC. Depth to water following pump placement = 31.32 ft BTOC.

0914 Begin purging well with bladder pump (non-dedicated). Troubleshoot controller settings before connecting to flow-through cell.

0924 Connect flow-through cell. Settings: 20 s fill, 10 s discharge, 20 psi and 100 mL/min.

0927 First parameter reading - flow through cell is full.

0935 Conduct well inspection.

1017 Well is stable - purged total of 6.50 liters. Collect [C6WMW-115-1048-GW] for SVOCs/Low level PAHs (3 1-liter unpreserved ambers) and RCRA Metals (1-500 mL HNO3 poly) = 4 bottles total.

1055 Done filling all bottleware. Pack up supplies

Daily Weather Conditions: A.M. ~55, overcast/drizzle, mod. humidity, no breeze

P.M. N/A

Recorded By Hillary Oswald QA Checked By

2

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/16/18

Su M (Tu) W Th F Sa PAGE 2 OF 2

Task Team Members:
Hillary Oswald - BayWest
Andy Steffe - Leidos

10/16/18

Narrative (include time and location):
1110 Depart well location.

10/16/18

Daily Weather Conditions: A.M. ~60°, overcast, mod. humidity, no breeze

P.M. N/A

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 10/16/18 TIME: 08:55

WELL ID NUMBER: MW-115 WELL LOCATION: Old Landfill Area / SWMU 19/29

DEPTH OF SCREENED INTERVAL(toc notch): 30.85 ft. to 40.85 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: #34026

DEPTH TO WATER: 31.34 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 30.85 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~35.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 0914 PURGE END TIME: 1017

TOTAL VOLUME PURGED 6.50 liters

SITE CONDITIONS DURING PURGING: none noteable - water is very clear

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none noteable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/16/18

Su M (Tu) W Th F Sa PAGE 1 OF 2

Task Team Members:
Hillary Oswald - BayWest
Andy Steffe - Leidos

10/16/18

Narrative (include time and location):

1210 Arrive at MW-114 location. PID = 0.0ppm. Depth to water = 37.89 ft BTOC. Total well depth = 104.89 ft BTOC. ~~Depth~~ to water following pump placement = 36.77 ft BTOC

1235 Begin purging well with non-dedicated bladder pump. Troubleshoot settings before connecting flow-through cell.

1250 Connect flow-through cell. Controller settings: 45 s fill, 15 s discharge, 45 psi & 50 mL/min.

1258 First parameter reading - flow-through cell is full.

1310 Conduct well inspection.

1403 Well is stable - purged 4.25 liters. Collect CGWMW-114-1046-GW for SVOCs/low level PAHs (3 · 1-liter unpreserved ambers) & RCRA Metals (1 · 500 mL HNO3 poly) = 4 bottles total.

1515 1515 Done filling bottleware - pack up supplies.

1530 Depart well location. Help Andy sample MW-48

1700 At Bldg 7. Decon pump # 10799 & prep to collect rinsat.

Daily Weather Conditions: A.M. N/A

P.M. ~60°, overcast, mod. humidity, no breeze

Recorded By Hillary Oswald QA Checked By

8

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/16/18

Su M (Tu) W Th F Sa PAGE 2 OF 2

Task Team Members:
Hillary Oswald - Bay West
Andy Steele - Leidos

10/16/18

Narrative (include time and location):
1720 Collect [C6WMW-114-1047-ER] for SVOCs / Low Level PAHs (3 1-liter unpreserved ambers) & RCRA Metals (1-500 mL HNO_3 poly) = 4 bottles total

10/16/18

Daily Weather Conditions: A.M. N/A

P.M. ~65°, overcast/drizzle, mod humidity, no breeze

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 10/16/18 TIME: 12 : 10

WELL ID NUMBER: MW-114 WELL LOCATION: old Landfill Area / SWMU 19/29

DEPTH OF SCREENED INTERVAL(toc notch): 95.87 ft. to 105.87 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 01-1170

TURBIDITY ID: #340216

DEPTH TO WATER: 37.89 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 95.87 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~100.0 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 1235 PURGE END TIME: 1403

TOTAL VOLUME PURGED 4.25 liters

SITE CONDITIONS DURING PURGING: difficult to get water level to stabilize

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none notable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

01

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/17/18

Su M Tu (W) Th F Sa PAGE 1 OF 1

Task Team Members:
Hillary Oswald - Bay West
Andy Steffe - Leidos

HDO 10/17/18

Narrative (include time and location):

0835 Arrive at MW-104 location. PID = 0.2 ppm. Depth to water = 8.61 ft BTOC. Total well depth = 19.05 ft BTOC. Depth to water following pump placement = 8.58 ft BTOC.

0845 Begin purging well with non-dedicated bladder pump. Trouble-shoot settings before connecting flow-through cell.

0850 Connect flow-through cell. Controller settings: 26 s fill, 4 s discharge, 10 psi & 50 mL/min.

0858 First parameter readings - flow-through cell is full.

0905 Conduct well inspection.

0948 well stable after purging 2.75 liters. Collect CGWMW-104-1038-GW for ~~SVOCs~~ Low level PAHs (2 1-liter unpreserved ambers) & VOCs (3 40 mL HCl VOAs) = 5 bottles total. Collected Trip Blank (3 VOCs) CGWMW-TB-105; TB

HDO 10/17/18

1032 Done filling all bottleware. Pack up supplies.

HDO 10/17/18

1050 Depart well location.

HDO 10/17/18

Daily Weather Conditions: A.M. ~55°, partly cloudy, mod. humidity, no breeze

P.M. N/A

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 10/17/18

WELL ID NUMBER: MW-104

TIME: 08:35

WELL LOCATION: Area A Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 8.95 ft. to 18.95 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 39350

TURBIDITY ID: 34026

DEPTH TO WATER: 8.61 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 8.95 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: ~14 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 0845 PURGE END TIME: 0948

TOTAL VOLUME PURGED 2.75 liters

SITE CONDITIONS DURING PURGING: none notable

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none notable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 10/17/18

Su M Tu (W) Th F Sa PAGE 1 OF 1

Task Team Members:
Hillary Oswald - Bay West
Andy Steffe - Leidos

10/17/18

Narrative (include time and location):

1100 Arrive at MW-106. PID = 0.0 ppm. Depth to water = 13.02 Ft BTOC. Total well depth = 19.40 Ft BTOC. Depth to water following pump placement = 12.88 Ft BTOC.

1111 Begin purging using non-dedicated bladder pump. Trouble-shoot settings.

1114 Connect flow-through cell. Controller settings: 25 s fill, 5 s discharge, 10 psi & 50 mL/min.

1120 First parameter reading - flow through cell full. -conduct well inspection

1155 Well stable after purging 2.0 liters. Collect COW MW-106-1040-GW for low level PAHs (2 1-liter unpreserved ambers) & VOCs (3 · 40mL HCl VOAs) = 5 bottles total.

1235 Done filling all bottle ware. Pack up supplies.

1250 Depart well location.

10/17/18

Daily Weather Conditions: A.M. N/A

P.M. ~65°, mostly sunny, mod humidity, slight breeze

Recorded By Hillary Oswald QA Checked By

GROUND WATER MICRO PURGE SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

DATE (mm/dd/yy): 10/17/18 TIME: 11:00

WELL ID NUMBER: MW-106 WELL LOCATION: Area A Boundary

DEPTH OF SCREENED INTERVAL(toc notch): 9.54 ft. to 19.54 ft.

INNER CASING: TYPE (PVC) ID: (2 inches)

PURGE SAVER ID: N/A

WATER LEVEL INDICATOR ID: 39350

TURBIDITY ID: 34026

DEPTH TO WATER: 13.02 FT FROM MEASURE POINT

DEPTH TO TOP OF SCREEN: 9.54 FT FROM MEASURE POINT

DEPTH TO PUMP INTAKE: 16.50 FT FROM MEASURE POINT

PURGE/SAMPLE METHOD: [ ] Bailer [X] Bladder Pump [ ] Pump Type _____ PUMP ID: 10799

PURGE START TIME: 1111 PURGE END TIME: 1155

TOTAL VOLUME PURGED 2.0 liters

SITE CONDITIONS DURING PURGING: no train traffic

NOTE: IF WELL HAS A DEDICATED PUMP, IT IS TO BE USED.

FIELD OBSERVATIONS: none notable

S&A PLAN SAMPLING PROCEDURE FOLLOWED: [X] YES [ ] NO IF NO, WHY WAS A DEVIATION NECESSARY: _____

RECORDED BY: _____ (Signature) QA CHECKED BY: _____ (Signature)

APPENDIX A.3
SURFACE WATER SAMPLING LOGS

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 4-2-18

Su (M) Tu W Th F Sa

PAGE 4 OF 7

Task Team Members:
Crystal Hann
Hillary Oswald
Jasmine Stefansky

Narrative (include time and location):

0720: Arrive at SW-01

0740: Collect CSWSW-001-1026-SW for VOCs, SVOCs, PAHs, Explosives, pesticides, bromacil, + metals. and associated trip blank CGWMW-TB-1033-TB.
pH= 6.09 SU, Cond = 0.309 mS/cm, turb= 21.6 NTU
DO = 10.60 mg/L, temp = 13.67 °C, ORP = 351 mV.

0910: Arrive at SW-02 waiting to get into gate.

0945: Collect CSWSW-002-1027-SW for VOCs, SVOCs, PAHs, metals, explosives, Pesticides, bromacil. pH = 7.27 SU, Cond= 0.268 mS/cm, turb= 10.1 NTUS, DO=9.95 mg/L, Temp = 17.52°C, ORP= 199 mV.

Depart SW-002 for field office

1300: Arrive at SW-03.

Daily Weather Conditions: A.M. Sunny 55-65°

P.M. ———

Recorded By Crystal Hann QA Checked By

74

TASK TEAM ACTIVITY LOG SHEET

PROJECT NAME: Holston Army Ammunition Plant **DELIVERY ORDER NO: CK01**

Date (mm/dd/yy): 4-2-18

Su (M) Tu W Th F Sa PAGE 2 OF 2

Task Team Members:
Crystal Hann
Hillary McGowen
Jasmine Stefansky

Narrative (include time and location):

1310: Collect CSWSW-003-1029-SV for VOCs, SVOCs, PAHs, Explosives, pesticides, Bromacil, & metals
pH = 7.10 SU, Cond = 0.277 mS/cm, turb = 21.1 NTU, DO = 10.35 mg/L, temp = 14.49 °C, ORP = 252 mV

1325 Complete sampling and depart location

Note: at SW-02 collected FD CSWSW-002-1028-QA
+ MS/MSD CSWSW-002-1027-MS01MS

Daily Weather Conditions: A.M. —

P.M. Cloudy ~65°

Recorded By Crystal Hann QA Checked By

APPENDIX A.4
WELL INSPECTIONS
(SPRING AND FALL 2018)

SPRING 2018

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 03/27/18
Time: 1202

WELL INFORMATION

Well Number: GM-12

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screened

Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 73.73 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "GM-12" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 73.52 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.21 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 03/27/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-28-18
Time: 1125

WELL INFORMATION

Well Number: GM-14

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 47.31 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Stickes GM-14				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 47.40 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): NA				
Are there any obstructions in the well?		✓		

Inspection Date: 3-28-18

Inspected by: Crystal Hm

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-28-18
Time: 0855

WELL INFORMATION

Well Number: MW-11

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 18.00 ft BGS or BTOC (circle one)

If total depth = 14.20 ft BGS. And the stick up is only ≈ 1.5 ft Above ground surface, The total depth should be close-to 16 ft BGS. Construction details slightly off.

INSPECTION ITEMS

	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Stickers 11				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 16.65 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 1.35 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-28-18

Inspected by: Crystal Flores

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3/28/18
Time: 0850

WELL INFORMATION

Well Number: MW-11B

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: open-hole

Monitor Interval Length: 47 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 63.47 ft BGS or ~~BTOC~~ (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "11 B" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 61.70 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 1.77 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 03/28/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 15:50

WELL INFORMATION

Well Number: MW-15

Location/Functional Area: Adm. N

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 24.21 ft BGS or BTOC (circle one)

INSPECTION ITEMS WL= 6.50 ft BTOC

	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: MW-15				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)	✓			
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 24.21 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.04 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-25-18

Inspected by: Curt Hahn

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 1658

WELL INFORMATION

Well Number: MW-23 Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 15.20 ft BGS of (BTOC) (circle one)

INSPECTION ITEMS wl= 5.48 ft BTOC

	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: MW.23				
Security:				
Does the well have a cap or lid?			✓	
Does the well have a weatherproof lock?			✓	
Does the lock secure the well?			✓	
Does the inner casing have a cap?			✓	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 15.18 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.025 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-25-18 Inspected by: Curtis Jen

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 1650

WELL INFORMATION

Well Number: MW-27

Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 4 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 10.80 ft BGS or (BTOC) (circle one)

wl = 8.64 Ft BTOC

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Stickers MW-27				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 10.95 Ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): NA				
Are there any obstructions in the well?		✓		

Inspection Date: 3-25-18

Inspected by: Crystal Flinn

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 14:14

WELL INFORMATION

Well Number: MW-39

Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 16.22 ft BGS or BTOC (circle one)

INSPECTION ITEMS WL = 8.55 ft BTOC

	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[✓] ce 3-25-18	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[✓]	[ ]	
Is a concrete pad installed?	[✓]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[✓]	[ ]	
Is steel protective casing installed?	[✓]	[ ]	[ ]	
Does the protective casing have a weep hole?	[✓]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[✓]	
Does the well have a flush-mount box?	[ ]	[ ]	[✓]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[✓]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[✓]	
Identification:				
Is the well labeled with the correct number?	[✓]	[ ]	[ ]	
Describe labeling: sticker MW-39				
Security:				
Does the well have a cap or lid?	[✓]	[ ]	[ ]	
Does the well have a weatherproof lock?	[✓]	[ ]	[ ]	
Does the lock secure the well?	[✓]	[ ]	[ ]	
Does the inner casing have a cap?	[✓]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[✓]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[✓]	[ ]	
Is a measurement point marked at the top of the well casing?	[✓]	[ ]	[ ]	
Measured depth of the well from measurement point: 16.20 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.02 ft				
Are there any obstructions in the well?	[ ]	[✓]	[ ]	

Inspection Date: 3.25-18

Inspected by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 03/31/18
Time: 0945

WELL INFORMATION

Well Number: MW-48

Location/Functional Area: Old Landfill / SWMU 19/29

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: screened

Monitor Interval Length: N/A Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 66.90 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "48" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 66.90 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): N/A = 0.00 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 03/31/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 04/04/18
Time: 1105

WELL INFORMATION

Well Number: MW-55

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 117.72 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	X			
Are any of the posts damaged or degraded?		X		
Is a concrete pad installed?	X			
Is the pad cracked or deteriorated?		X		
Is steel protective casing installed?	X			
Does the protective casing have a weep hole?	X			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			X	
Does the well have a flush-mount box?			X	
Is the traffic cover cracked or broken?			X	
Is the concrete apron cracked or deteriorated?			X	
Identification:				
Is the well labeled with the correct number?	X			
Describe labeling: "55" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	X			
Does the well have a weatherproof lock?	X			
Does the lock secure the well?	X			
Does the inner casing have a cap?	X			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		X		
Is the well casing loose (at the surface?)		X		
Is a measurement point marked at the top of the well casing?	X			
Measured depth of the well from measurement point: 118.20 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): N/A				
Are there any obstructions in the well?		X		

Inspection Date: 04/04/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 03/31/18
Time: 1412

WELL INFORMATION

Well Number: MW-68

Location/Functional Area: Old Landfill / SWMU 20

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screened

Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 43.57 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 2				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "68" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 43.42 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.15 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 03/31/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-31-18
Time: 1550

WELL INFORMATION

Well Number: MW-68B

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: NA

Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 79.33 ft BGS or BTOC (circle one)

INSPECTION ITEMS

wl = 30.12 ft BTOC

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 2				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Sticker 68B ex 3-31-18 MW-68B				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 79.48 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): NA				
Are there any obstructions in the well?		✓		

Inspection Date: 3-31-18

Inspected by: Hilary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 12:00
Time: 4/3/18

WELL INFORMATION

Well Number: MW70

Location/Functional Area: SWMU 18 source

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screened

Monitor Interval Length: 10.0 Ft

Flush-mount/Above-ground Completion: Above grand

Reported Constructed Depth: 52.50 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: Sticker 70				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 53.10 (soft bottom)				
Thickness of sediment accumulation (reported depth-present measurement): NA				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 4/3/18

Inspected by: Jasmine Stefansky

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 04/03/18
Time: 1010

WELL INFORMATION

Well Number: MW-73

Location/Functional Area: Admin

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 16.50 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4 ~~16.50~~ 4/3/18				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "73" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 15.22 ft BTOC (hard bottom)				
Thickness of sediment accumulation (reported depth-present measurement): 1.28 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 04/03/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-3-18
Time: 0915

WELL INFORMATION

Well Number: MW-75

Location/Functional Area: Admin

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: ~~Above~~ LR4-318 Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: ~~10~~ LR4-318 15.50 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Sticker 75				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 15.20 ft BTOC				5 ft
Thickness of sediment accumulation (reported depth-present measurement): 0.30 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 4-3-18

Inspected by: Crystal Jenn

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 1620

WELL INFORMATION

Well Number: MW-76

Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: NA

Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 15.56 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS (wl = 6.19 ft BTOC)	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Sticker MW-76				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 15.53 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.03 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-25-18

Inspected by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 1640

WELL INFORMATION

Well Number: MW-77

Location/Functional Area: Production

Casing Type: ______ Steel ______ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 20.50 ft BGS or BTOC (circle one) [BTOC circled]

INSPECTION ITEMS WL = 8.89 ft BTOC	**YES**	**NO**	**N/A**	**COMMENTS**
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[✓]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[✓]	[ ]	
Is a concrete pad installed?	[✓]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[✓]	[ ]	
Is steel protective casing installed?	[✓]	[ ]	[ ]	
Does the protective casing have a weep hole?	[✓]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[✓]	
Does the well have a flush-mount box?	[ ]	[ ]	[✓]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[✓]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[✓]	
Identification:				
Is the well labeled with the correct number?	[✓]	[ ]	[ ]	
Describe labeling: Sticker MW-77				
Security:				
Does the well have a cap or lid?	[✓]	[ ]	[ ]	
Does the well have a weatherproof lock?	[✓]	[ ]	[ ]	
Does the lock secure the well?	[✓]	[ ]	[ ]	
Does the inner casing have a cap?	[✓]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[✓]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[✓]	[ ]	
Is a measurement point marked at the top of the well casing?	[✓]	[ ]	[ ]	
Measured depth of the well from measurement point: 20.35 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.15 ft				
Are there any obstructions in the well?	[ ]	[✓]	[ ]	

Inspection Date: 3-25-18

Inspected by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 1635

WELL INFORMATION

Well Number: MW-78

Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Flush

Reported Constructed Depth: 20.75 ft BGS or BTOC (circle one)

WL = 9.26 ft BTOC

INSPECTION ITEMS	**YES**	**NO**	**N/A**	**COMMENTS**
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: NA				
Are the posts positioned to prevent collision damage to the well?	[ ]	[ ]	[X]	
Are any of the posts damaged or degraded?	[ ]	[ ]	[X]	
Is a concrete pad installed?	[ ]	[ ]	[X]	
Is the pad cracked or deteriorated?	[ ]	[ ]	[X]	
Is steel protective casing installed?	[ ]	[ ]	[X]	
Does the protective casing have a weep hole?	[ ]	[ ]	[X]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[✓]	[ ]	[ ]	
Does the well have a flush-mount box?	[✓]	[ ]	[ ]	
Is the traffic cover cracked or broken?	[ ]	[✓]	[ ]	
Is the concrete apron cracked or deteriorated?	[ ]	[✓]	[ ]	
Identification:				
Is the well labeled with the correct number?	[✓]	[ ]	[ ]	
Describe labeling: MW-78 on cover				
Security:				
Does the well have a cap or lid?	[✓]	[ ]	[ ]	
Does the well have a weatherproof lock?	[✓]	[ ]	[ ]	
Does the lock secure the well?	[✓]	[ ]	[ ]	
Does the inner casing have a cap?	[✓]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[✓]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[✓]	[ ]	
Is a measurement point marked at the top of the well casing?	[✓]	[ ]	[ ]	
Measured depth of the well from measurement point: 21.20 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): NA				
Are there any obstructions in the well?	[ ]	[✓]	[ ]	

Inspection Date: 3-25-18

Inspected by: Crystal Flynn

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HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-3-18
Time: 0939

WELL INFORMATION

Well Number: MW-86

Location/Functional Area: Admin

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 19.91 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Sticker 86				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 19.602 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.31 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 4-3-18

Inspected by: Crystal Flum

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 03/29/18
Time: 0950

WELL INFORMATION

Well Number: MW-91

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 16.44 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "91" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 16.20 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.24 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 03/29/18

Inspected by: William Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-29-18
Time: 1005

WELL INFORMATION

Well Number: MW-91B

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Open

Monitor Interval Length: 20 ✓ Ft (cl 3.29.18)

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 43.15 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Sticker 91B				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 43.96 ft BTOC Soft				
Thickness of sediment accumulation (reported depth-present measurement): N/A				
Are there any obstructions in the well?		✓		

Inspection Date: 3-29-18

Inspected by: Crystal Ken

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 15:59

WELL INFORMATION

Well Number: MW-96

Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 18.00 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS WL = 6.90 ft BTOC

	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: MW-96 Stickers				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 17.80 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.20 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-25-18

Inspected by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 16:05

WELL INFORMATION 3-25-18

Well Number: MW-9697 Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 16.81 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS WL= 3,53

	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[✓]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[✓]	[ ]	
Is a concrete pad installed?	[✓]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[✓]	[ ]	
Is steel protective casing installed?	[✓]	[ ]	[ ]	
Does the protective casing have a weep hole?	[✓]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[✓]	
Does the well have a flush-mount box?	[ ]	[ ]	[✓]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[✓]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[✓]	
Identification:				
Is the well labeled with the correct number?	[✓]	[ ]	[ ]	
Describe labeling: Sticker MW-97				
Security:				
Does the well have a cap or lid?	[✓]	[ ]	[ ]	
Does the well have a weatherproof lock?	[✓]	[ ]	[ ]	
Does the lock secure the well?	[✓]	[ ]	[ ]	
Does the inner casing have a cap?	[✓]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[✓]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[✓]	[ ]	
Is a measurement point marked at the top of the well casing?	[✓]	[ ]	[ ]	
Measured depth of the well from measurement point: 16.50 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.31 ft Salt				
Are there any obstructions in the well?	[ ]	[✓]	[ ]	

Inspection Date: 3-25-18 Inspected by: Crystal Crum

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4/4/18
Time: 0905

WELL INFORMATION

Well Number: MW99

Location/Functional Area: Production Source

Casing Type: _____ Steel _____ Stainless Steel X PVC

Screened/Open-Hole Well Type: Screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above ground

Reported Constructed Depth: 18.40 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: Sticker 99				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 18.40 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.04 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 4/4/18

Inspected by: Jasmine Stefanski

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-27-18
Time: 1510

WELL INFORMATION

Well Number: MW-101

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 19.61 ft BGS or BTOC (circle one)

INSPECTION ITEMS

	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Sticker 101				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 19.20 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.41 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-27-18

Inspected by: Crystal Hm

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 03/27/18
Time: 1515

WELL INFORMATION

Well Number: MW-101B

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: open-hole

Monitor Interval Length: 37 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 63.81 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "101 B" stickers on protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 66.60 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): N/A				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 03/27/18

Inspected by: Tiffany Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-28-18
Time: 1405

WELL INFORMATION

Well Number: MW-102

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 18.00 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Sticker 102				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 17.85 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.15 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-28-18

Inspected by: Crystal Hess

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 03/28/18
Time: 1450

WELL INFORMATION

Well Number: MW-102B

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: open-hole

Monitor Interval Length: 24.5 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 26.49 ft BGS or (BTOC) (circle one) * reported construction depth was 26.49 in the CAO however, as reported in ERIS = 49.

INSPECTION ITEMS

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "102 B" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 49.27 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): N/A				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 03/28/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-1-18
Time: 0945

WELL INFORMATION

Well Number: MW-104

Location/Functional Area: Area A

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Flush

Reported Constructed Depth: 18.95 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 0				
Are the posts positioned to prevent collision damage to the well?	[ ]	[ ]	[✓]	
Are any of the posts damaged or degraded?	[ ]	[ ]	[✓]	
Is a concrete pad installed?	[ ]	[ ]	[✓]	
Is the pad cracked or deteriorated?	[ ]	[ ]	[✓]	
Is steel protective casing installed?	[ ]	[ ]	[✓]	
Does the protective casing have a weep hole?	[ ]	[ ]	[✓]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[✓]	[ ]	[ ]	
Does the well have a flush-mount box?	[✓]	[ ]	[ ]	
Is the traffic cover cracked or broken?	[ ]	[✓]	[ ]	
Is the concrete apron cracked or deteriorated?	[ ]	[✓]	[ ]	
Identification:				
Is the well labeled with the correct number?	[✓]	[ ]	[ ]	
Describe labeling: Stippled well lid				
Security:				
Does the well have a cap or lid?	[✓]	[ ]	[ ]	
Does the well have a weatherproof lock?	[✓]	[ ]	[ ]	
Does the lock secure the well?	[✓]	[ ]	[ ]	
Does the inner casing have a cap?	[✓]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[✓]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[✓]	[ ]	
Is a measurement point marked at the top of the well casing?	[✓]	[ ]	[ ]	
Measured depth of the well from measurement point: 18.80 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.15 ft				
Are there any obstructions in the well?	[ ]	[✓]	[ ]	

Inspection Date: 04-01-18

Inspected by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 04/01/18
Time: 0950

WELL INFORMATION

Well Number: MW-105

Location/Functional Area: Area A Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: flush-mount

Reported Constructed Depth: 19.43 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 0				
Are the posts positioned to prevent collision damage to the well?	[ ]	[ ]	[X]	
Are any of the posts damaged or degraded?	[ ]	[ ]	[X]	
Is a concrete pad installed?	[ ]	[ ]	[X]	
Is the pad cracked or deteriorated?	[ ]	[ ]	[X]	
Is steel protective casing installed?	[ ]	[ ]	[X]	
Does the protective casing have a weep hole?	[ ]	[ ]	[X]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[X]	[ ]	[ ]	
Does the well have a flush-mount box?	[X]	[ ]	[ ]	
Is the traffic cover cracked or broken?	[ ]	[X]	[ ]	
Is the concrete apron cracked or deteriorated?	[ ]	[X]	[ ]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "MW-105" written in paint on concrete well pad				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 18.95 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.48 Ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 04/01/18

Inspected by: Hillary Oswald

6

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 4-1-18
Time: 1342

WELL INFORMATION

Well Number: MW-106 Location/Functional Area: Area A

Casing Type: ______ Steel ______ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Flush

Reported Constructed Depth: 19.54 ft BGS or BTOC (circle one) — BTOC circled

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 0				
Are the posts positioned to prevent collision damage to the well?	[ ]	[ ]	[✓]	
Are any of the posts damaged or degraded?	[ ]	[ ]	[✓]	
Is a concrete pad installed?	[ ]	[ ]	[✓]	
Is the pad cracked or deteriorated?	[ ]	[ ]	[✓]	
Is steel protective casing installed?	[ ]	[ ]	[✓]	
Does the protective casing have a weep hole?	[ ]	[ ]	[✓]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[✓]	[ ]	[ ]	
Does the well have a flush-mount box?	[✓]	[ ]	[ ]	
Is the traffic cover cracked or broken?	[ ]	[✓]	[ ]	
Is the concrete apron cracked or deteriorated?	[ ]	[✓]	[ ]	
Identification:				
Is the well labeled with the correct number?	[✓]	[ ]	[ ]	
Describe labeling: Stippled on cover				
Security:				
Does the well have a cap or lid?	[✓]	[ ]	[ ]	
Does the well have a weatherproof lock?	[✓]	[ ]	[ ]	
Does the lock secure the well?	[✓]	[ ]	[ ]	
Does the inner casing have a cap?	[✓]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[✓]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[✓]	[ ]	
Is a measurement point marked at the top of the well casing?	[✓]	[ ]	[ ]	
Measured depth of the well from measurement point: 19.20 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.34 ft				
Are there any obstructions in the well?	[ ]	[✓]	[ ]	

Inspection Date: ~~8~~ 4-1-18 (initialed)

Inspected by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 04/01/18
Time: 1150

WELL INFORMATION

Well Number: MW-107

Location/Functional Area: Area A Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: flush-mount

Reported Constructed Depth: 18.88 ft BGS or ~~BTOC~~ (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 0				
Are the posts positioned to prevent collision damage to the well?	[ ]	[ ]	[X]	
Are any of the posts damaged or degraded?	[ ]	[ ]	[X]	
Is a concrete pad installed?	[ ]	[ ]	[X]	
Is the pad cracked or deteriorated?	[ ]	[ ]	[X]	
Is steel protective casing installed?	[ ]	[ ]	[X]	
Does the protective casing have a weep hole?	[ ]	[ ]	[X]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[X]	[ ]	[ ]	
Does the well have a flush-mount box?	[X]	[ ]	[ ]	
Is the traffic cover cracked or broken?	[ ]	[X]	[ ]	
Is the concrete apron cracked or deteriorated?	[ ]	[X]	[ ]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "MW 107" stamped onto flush-mount box				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 18.83 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.05 FT				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 04/01/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-31-18
Time: 1020

WELL INFORMATION

Well Number: MW-114

Location/Functional Area: Old Landfill

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 105.87 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Sticker 114				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 104.65 ft BTOC				Soft
Thickness of sediment accumulation (reported depth-present measurement): 1.22 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-31-18

Inspected by: Crystal

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 03/31/18
Time: 1105

WELL INFORMATION

Well Number: MW-115

Location/Functional Area: Old Landfill / SWMU 19/29

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 40.85 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "115" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 40.40 FT BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.45 FT				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 03/31/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-31-18
Time: 1430

WELL INFORMATION

Well Number: MW-116

Location/Functional Area: Old Landfill

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 20 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 119.80 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Stickers 116				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 121.89 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): NA				
Are there any obstructions in the well?		✓		

Inspection Date: 3-31-18

Inspected by: Crystal Hall

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 1730

WELL INFORMATION

Well Number: MW-118B

Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 22.30 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS wl = 6.47 ft BTOC

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Sticker MW-118B				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 22.30 ft BTOC Solid				
Thickness of sediment accumulation (reported depth-present measurement): 0.0 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-25-18

Inspected by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 1705

WELL INFORMATION

Well Number: MW-126

Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 5 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 15.14 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS wl = 3.40 Ft BTOC	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Stickers MW126				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 14.68 Ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.46 ft BTOC				
Are there any obstructions in the well?		✓		

Inspection Date: 3-25-14

Inspected by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-25-18
Time: 1715

WELL INFORMATION

Well Number: MW-127

Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 5 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 13.95 ft BGS or BTOC (circle one)

WL = 2.82 ft BTOC

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: stickers MW 127				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 14.38 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.43 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-25-18

Inspected by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 03/28/18
Time: 1150

WELL INFORMATION

Well Number: MW-S1A

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screened

Monitor Interval Length: 5 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 17.01 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "S1 A" Stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 16.79 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.22 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 03/20/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 03/28/18
Time: 1305

WELL INFORMATION

Well Number: MW-51B

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: N/A

Monitor Interval Length: N/A Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 39.63 ft BGS or (BTOC) (circle one)

WL = 4.21 ft BTOC

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "51 B" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 39.53 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.10 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 03/28/18

Inspected by: Hilary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-27-18
Time: 0958

WELL INFORMATION

Well Number: STmw-2

Location/Functional Area: Production

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: ~~Slotted~~ NA

Monitor Interval Length: NA Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: NA ft BGS or (BTOC) (circle one)

INSPECTION ITEMS wl = 4.42 ft BTOC

	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Sticker STmw-2				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 16.38 Ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): NA				
Are there any obstructions in the well?		✓		

Inspection Date: 3-27-18

Inspected by: Cupelton

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 3-27-18
Time: 1150

WELL INFORMATION

Well Number: STMW-15

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screen

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: Above

Reported Constructed Depth: 32.21 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	✓			
Are any of the posts damaged or degraded?		✓		
Is a concrete pad installed?	✓			
Is the pad cracked or deteriorated?		✓		
Is steel protective casing installed?	✓			
Does the protective casing have a weep hole?	✓			
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?			✓	
Does the well have a flush-mount box?			✓	
Is the traffic cover cracked or broken?			✓	
Is the concrete apron cracked or deteriorated?			✓	
Identification:				
Is the well labeled with the correct number?	✓			
Describe labeling: Stickers STMW-15				
Security:				
Does the well have a cap or lid?	✓			
Does the well have a weatherproof lock?	✓			
Does the lock secure the well?	✓			
Does the inner casing have a cap?	✓			
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)		✓		
Is the well casing loose (at the surface?)		✓		
Is a measurement point marked at the top of the well casing?	✓			
Measured depth of the well from measurement point: 32.18 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.03 ft				
Are there any obstructions in the well?		✓		

Inspection Date: 3-27-18

Inspected by: [signature]

FALL 2018

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/17/18
Time: 0905

WELL INFORMATION

Well Number: MW-104

Location/Functional Area: Area A Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: flush-mount

Reported Constructed Depth: 18.95 ft BGS or ~~BTOC~~ (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: N/A				
Are the posts positioned to prevent collision damage to the well?	[ ]	[ ]	[X]	
Are any of the posts damaged or degraded?	[ ]	[ ]	[X]	
Is a concrete pad installed?	[ ]	[ ]	[X]	
Is the pad cracked or deteriorated?	[ ]	[ ]	[X]	
Is steel protective casing installed?	[ ]	[ ]	[X]	
Does the protective casing have a weep hole?	[ ]	[ ]	[X]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[X]	[ ]	[ ]	
Does the well have a flush-mount box?	[X]	[ ]	[ ]	
Is the traffic cover cracked or broken?	[ ]	[X]	[ ]	
Is the concrete apron cracked or deteriorated?	[ ]	[X]	[ ]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "MW 104" stamped onto flush mount box				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 19.05 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): N/A				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/17/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/17/18
Time: 0833

WELL INFORMATION

Well Number: MW-105

Location/Functional Area: AREA A

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: FLUSH MOUNT

Reported Constructed Depth: 19.43' ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 0				
Are the posts positioned to prevent collision damage to the well?	[ ]	[ ]	[X]	
Are any of the posts damaged or degraded?	[ ]	[ ]	[X]	
Is a concrete pad installed?	~~[X]~~	[ ]	[X]	
Is the pad cracked or deteriorated?	[ ]	~~[X]~~	[X]	
Is steel protective casing installed?	[ ]	[ ]	[X]	
Does the protective casing have a weep hole?	[ ]	[ ]	[X]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[X]	[ ]	[ ]	
Does the well have a flush-mount box?	[X]	[ ]	[ ]	
Is the traffic cover cracked or broken?	[ ]	[X]	[ ]	
Is the concrete apron cracked or deteriorated?	[ ]	[X]	[ ]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: MW-105 PAINTED ON CONCRETE, ~~[illegible]~~ 10/17/18				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 18.75'				
Thickness of sediment accumulation (reported depth-present measurement): 0.68'				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/17/18

Inspected by: Graham S Cuffe

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/17/18
Time: 1120

WELL INFORMATION

Well Number: MW-106

Location/Functional Area: Area A Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: flush-mount

Reported Constructed Depth: 19.54 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: NA				
Are the posts positioned to prevent collision damage to the well?	[ ]	[ ]	[✓]	
Are any of the posts damaged or degraded?	[ ]	[ ]	[X]	
Is a concrete pad installed?	[ ]	[ ]	[X]	
Is the pad cracked or deteriorated?	[ ]	[ ]	[X]	
Is steel protective casing installed?	[ ]	[ ]	[X]	
Does the protective casing have a weep hole?	[ ]	[ ]	[X]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[X]	[ ]	[ ]	
Does the well have a flush-mount box?	[X]	[ ]	[ ]	
Is the traffic cover cracked or broken?	[ ]	[X]	[ ]	
Is the concrete apron cracked or deteriorated?	[ ]	[X]	[ ]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "MW 106" stamped onto flush-mount box				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 19.40 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.14 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/17/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/17/18
Time: 0920

WELL INFORMATION

Well Number: MW-107

Location/Functional Area: AREA A

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: FLUSH-MOUNT 5/18/18

DTW = 7.05'

Reported Constructed Depth: 18.88' ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 5				
Are the posts positioned to prevent collision damage to the well?	[ ]	[ ]	[X]	
Are any of the posts damaged or degraded?	[ ]	[ ]	[X]	
Is a concrete pad installed?	[ ]	[ ]	[X]	
Is the pad cracked or deteriorated?	[ ]	[ ]	[X]	
Is steel protective casing installed?	[ ]	[ ]	[X]	
Does the protective casing have a weep hole?	[ ]	[ ]	[X]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[X]	[ ]	[ ]	
Does the well have a flush-mount box?	[X]	[ ]	[ ]	
Is the traffic cover cracked or broken?	[ ]	[X]	[ ]	
Is the concrete apron cracked or deteriorated?	[ ]	[X]	[ ]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: STAMPED "MW-107" ON LID				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	~~[X]~~	
Is the well casing loose (at the surface?)	[ ]	[X]	~~[X]~~	10/17/18
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 18.82', SOLID BOTTOM				
Thickness of sediment accumulation (reported depth-present measurement): 0.06'				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/17/18

Inspected by: Andrew S Tuffy

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

12/15/18

WELL INFORMATION

Well Number: MW-55

Location/Functional Area: BOUNDARY, FORMER QUARRY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW = 85.19' BTOC

Reported Constructed Depth: 117.72' ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "55" STICKERS ON PROTECTIVE STEEL CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 118.20', MUDDY BOTTOM				
Thickness of sediment accumulation (reported depth-present measurement): N/A. REPORTED DEPTH WRONG				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/8/18 @ 1025

Inspected by: Autumn Stuff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/16/18
Time: 1125

WELL INFORMATION

Well Number: MW-48

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: N/A ? Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

Reported Constructed Depth: 66.90 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "48" STICKERS ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 66.85				
Thickness of sediment accumulation (reported depth-present measurement): 0.05'				
Are there any obstructions in the well?	[X]	[ ]	[ ]	A 10/16/18 ~~BAILER~~ MEASURING SOCK

Inspection Date: 10/16/18

Inspected by: Andrew Stoffle

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/16/18
Time: 1310

WELL INFORMATION

Well Number: MW-114

Location/Functional Area: Old Landfill Area / SWMU 19/29

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 105.87 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "114" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 104.89				
Thickness of sediment accumulation (reported depth-present measurement): 0.98 ft				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/16/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/16/18
Time: 0935

WELL INFORMATION

Well Number: MW-115

Location/Functional Area: old landfill Area / SWMU 19/29

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: Screened

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: above-ground

Reported Constructed Depth: 40.85 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[x]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[x]	[ ]	
Is a concrete pad installed?	[x]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[x]	[ ]	
Is steel protective casing installed?	[x]	[ ]	[ ]	
Does the protective casing have a weep hole?	[x]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[x]	
Does the well have a flush-mount box?	[ ]	[ ]	[x]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[x]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[x]	
Identification:				
Is the well labeled with the correct number?	[x]	[ ]	[ ]	
Describe labeling: "115" stickers on steel protective casing				
Security:				
Does the well have a cap or lid?	[x]	[ ]	[ ]	
Does the well have a weatherproof lock?	[x]	[ ]	[ ]	
Does the lock secure the well?	[x]	[ ]	[ ]	
Does the inner casing have a cap?	[x]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[x]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[x]	[ ]	
Is a measurement point marked at the top of the well casing?	[x]	[ ]	[ ]	
Measured depth of the well from measurement point: 40.38 ft BTOC				
Thickness of sediment accumulation (reported depth-present measurement): 0.48 ft				
Are there any obstructions in the well?	[ ]	[x]	[ ]	

Inspection Date: 10/16/18

Inspected by: Hillary Oswald

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/16/18
Time: 1245

WELL INFORMATION

Well Number: MW-116

Location/Functional Area: BOUNDARY / FORMER QUARRY

Casing Type: _____ Steel _____ Stainless Steel X PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 20' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

Reported Constructed Depth: 119.80' ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "116" STICKERS ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: TD > 100ft, NC				
Thickness of sediment accumulation (reported depth-present measurement): NC				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/16/18

Inspected by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/16/18
Time: 0900

WELL INFORMATION

Well Number: MW-68

Location/Functional Area: BOUNDARY / FORMER QUARRY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 20' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW = 34.20'

Reported Constructed Depth: 43.57' ft BGS or (BTOC) (circle one)

9.37' water column

Top of pump @ 38.65'

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 2				
Are the posts positioned to prevent collision damage to the well?	[✓]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[✓]	[ ]	
Is a concrete pad installed?	[✓]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[✓]	[ ]	
Is steel protective casing installed?	[✓]	[ ]	[ ]	
Does the protective casing have a weep hole?	[✓]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[✓]	
Does the well have a flush-mount box?	[ ]	[ ]	[✓]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[✓]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[✓]	
Identification:				
Is the well labeled with the correct number?	[✓]	[ ]	[ ]	
Describe labeling: "68" STICKERS ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[✓]	[ ]	[ ]	
Does the well have a weatherproof lock?	[✓]	[ ]	[ ]	
Does the lock secure the well?	[✓]	[ ]	[ ]	
Does the inner casing have a cap?	[✓]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[✓]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[✓]	[ ]	
Is a measurement point marked at the top of the well casing?	[✓]	[ ]	[ ]	
Measured depth of the well from measurement point: NM - DEDICATED PUMP HUNG IN WELL				
Thickness of sediment accumulation (reported depth-present measurement): N/A				
Are there any obstructions in the well?	[X]	[ ]	[ ]	DEDICATED PUMP

Inspection Date: 10/16/18

Inspected by: Andrew Stuffle

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE 10/15/18
TIME: 1320

WELL INFORMATION

Well Number: GM-12

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 20' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW → 10.84'

Reported Constructed Depth: 73.73 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: (GM-12) STICKERS ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 73.65'				
Thickness of sediment accumulation (reported depth-present measurement): 0.08'				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18 Inspected by: Adam Stuff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE: 10/15/18
TIME: 1312

WELL INFORMATION

Well Number: GM-14

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREEN

Monitor Interval Length: 20' Ft

DTW = 10.63'

Flush-mount/Above-ground Completion: ABOVE-GROUND

Reported Constructed Depth: 47.31' ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "GM 14" STICKER ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 48.32'				
Thickness of sediment accumulation (reported depth-present measurement): N/A WELL CONSTRUCTION INFO WRONG				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18 Inspected by: Andrew Stoffa

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE : 10/15/18
TIME : 1425

WELL INFORMATION

Well Number: MW-101

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREEN

Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW -> 13.01'

Reported Constructed Depth: 19.61' ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "101" STICKER ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 19.50'				
Thickness of sediment accumulation (reported depth-present measurement): 0.11'				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18

Inspected by: Andrew Stoff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE 10/15/18
TIME 1437

WELL INFORMATION

Well Number: MW-101 B

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: OPEN

Monitor Interval Length: 37' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW → 12.70'

Reported Constructed Depth: 63.81' ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: 1013 Sticker				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 66.50'				
Thickness of sediment accumulation (reported depth-present measurement): N/A WELL CONSTRUCTION DEPTH WRONG				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18

Inspected by: Andrew Stuff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

10/15/18

WELL INFORMATION

Well Number: MW-11

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: ABOVE - GRADE

DTW -> 4.11'

Reported Constructed Depth: 18.000 ft BGS or ~~BTOC~~ (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: 4"				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[ ]	[X]	[ ]	NEEDS NEW WELL LOCK
Does the inner casing have a cap?	[X]	[ ]	[ ]	+ HINGE
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 16.95				
Thickness of sediment accumulation (reported depth-present measurement): 1.05'				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18 Inspected by: Ashum Staff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE: 10/15/18
TIME: 1547

WELL INFORMATION

Well Number: MW-11B

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: OPEN-HOLE

Monitor Interval Length: 47' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW -> 1.61'

Reported Constructed Depth: 63.47' ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "11B" STICKERS ON PROTECTIVE STEEL CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 62.80', VERY SOFT BOTTOM				
Thickness of sediment accumulation (reported depth-present measurement): 0.67'				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18

Inspected by: Graham C Stuff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE: 10/15/18
TIME: 1255

WELL INFORMATION

Well Number: MW-102

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW → 10.74'

Reported Constructed Depth: 18.00' ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "102" STICKERS ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 17.86				
Thickness of sediment accumulation (reported depth-present measurement): 0.14'				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18 Inspected by: Andrew Stuffle

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE 10/15/18
TIME 1250

WELL INFORMATION

Well Number: MW 102B

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED OPEN

Monitor Interval Length: 24.5' 10' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

BTW ⇒ 10.60'

Reported Constructed Depth: ~~48.00~~ B11 7/18 49.85 ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: ~~MW~~ "102B"				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 49.30' btoc				0.53'
Thickness of sediment accumulation (reported depth-present measurement): ~~NR REPORTED CONSTRUCTION DEPTH WRONG~~ B11 7/18				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18

Inspected by: Andrew Stoff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE : 10/15/18
TIME 1355

WELL INFORMATION

Well Number: MW-51A

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 5' Ft

DTW => 6.15'

Flush-mount/Above-ground Completion: ABOVE-GROUND

Reported Constructed Depth: 17.01 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "51A" STICKER ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 16.83'				
Thickness of sediment accumulation (reported depth-present measurement): 0.18'				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: ~~10/18/18~~ 10/15/18

Inspected by: Andrew Stiffler

QA by: _____

1

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE: 10/15/18
TIME: 1538

WELL INFORMATION

Well Number: MW-91

Location/Functional Area: BOUNDARY

Casing Type: ____ Steel ____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW → 6.94'

Reported Constructed Depth: 16.44' ft BGS or BTOC (circle one) [BTOC circled]

INSPECTION ITEMS

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[x]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[x]	[ ]	
Is a concrete pad installed?	[x]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[x]	[ ]	
Is steel protective casing installed?	[x]	[ ]	[ ]	
Does the protective casing have a weep hole?	[x]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[x]	
Does the well have a flush-mount box?	[ ]	[ ]	[x]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[x]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[x]	
Identification:				
Is the well labeled with the correct number?	[x]	[ ]	[ ]	
Describe labeling: "91" STICKERS ON PROTECTIVE STEEL CASING				
Security:				
Does the well have a cap or lid?	[x]	[ ]	[ ]	
Does the well have a weatherproof lock?	[x]	[ ]	[ ]	
Does the lock secure the well?	[x]	[ ]	[ ]	
Does the inner casing have a cap?	[x]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[x]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[x]	[ ]	
Is a measurement point marked at the top of the well casing?	[x]	[ ]	[ ]	
Measured depth of the well from measurement point: 16.33', SOFT BOTTOM				
Thickness of sediment accumulation (reported depth-present measurement): 0.11'				
Are there any obstructions in the well?	[ ]	[x]	[ ]	

Inspection Date: 10/15/18

Inspected by: [signature]

QA by: [signature]

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE : 10/15/18
TIME : 1535

WELL INFORMATION

Well Number: MW-91B

Location/Functional Area: BOUNDARY

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: OPEN-HOLE

Monitor Interval Length: 20 Ft

DTW - 76.61'

Flush-mount/Above-ground Completion: ABOVE-GROUND

Reported Constructed Depth: 43.15' ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "91B" STICKERS ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 43.95'				
Thickness of sediment accumulation (reported depth-present measurement): N/A REPORTED DEPTH WRONG				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18

Inspected by: Andrew Stuff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE 10/15/18
TIME: 1327

WELL INFORMATION

Well Number: STMW-15

Location/Functional Area: Boundary

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW → 13.66'

Reported Constructed Depth: 32.21' ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "STMW-15" STICKERS ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: ~~32.30'~~ 32.28				
Thickness of sediment accumulation (reported depth-present measurement): N/A WELL CONSTRUCTION WRONG				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18

Inspected by: Andrew Stoff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

Date: 10/15/18
Time: 1445

WELL INFORMATION

Well Number: MW-99

Location/Functional Area: SOURCE

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREEN

Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW -> 10.47'

Reported Constructed Depth: 18.40' ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "99" STICKERS				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 18.70'				
Thickness of sediment accumulation (reported depth-present measurement): N/A				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18

Inspected by: Andrew Stuff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

10/15/18

WELL INFORMATION

Well Number: MW-70

Location/Functional Area: SWMU-18

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW → 34.61'

Reported Constructed Depth: 52.50' ft BGS or BTOC (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	~~[X]~~ 10/15/18	
Describe labeling: "70" STICKERS ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 52.55', SOFT BOTTOM				
Thickness of sediment accumulation (reported depth-present measurement): N/A, WELL CONSTRUCTION WRONG				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18

Inspected by: Andrew Stiff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT DATE: 10/15/18
WELL INSPECTION CHECKLIST TIME: 1629

WELL INFORMATION

Well Number: MW-73 Location/Functional Area: SWMU 77/78/86/87

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND DTW → 6.38'

Reported Constructed Depth: 16.50 ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "73" SHARPIE ON PROTECTIVE STEEL CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 15.40'				
Thickness of sediment accumulation (reported depth-present measurement): 1.1'				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18 Inspected by: Andrew Stiff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

DATE: 10/15/18
TIME: 1635

WELL INFORMATION

Well Number: MW-75

Location/Functional Area: SWMU 77/78/86/87

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 10 Ft

Flush-mount/Above-ground Completion: ABOVE GROUND

DTW → 6.27'

Reported Constructed Depth: 15.50' ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 4				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "75" STICKERS ON PROTECTIVE STEEL CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 15.50', SOFT BOTTOM				
Thickness of sediment accumulation (reported depth-present measurement): N/A.				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18

Inspected by: Andrew Stiff

QA by: _____

HOLSTON ARMY AMMUNITION PLANT
WELL INSPECTION CHECKLIST

10/15/18

WELL INFORMATION

Well Number: MW-86

Location/Functional Area: SWMU-88

Casing Type: _____ Steel _____ Stainless Steel ✓ PVC

Screened/Open-Hole Well Type: SCREENED

Monitor Interval Length: 10' Ft

Flush-mount/Above-ground Completion: ABOVE-GROUND

DTW - 10.71'

Reported Constructed Depth: 19.91' ft BGS or (BTOC) (circle one)

INSPECTION ITEMS	YES	NO	N/A	COMMENTS
Well-head Completion:				
Above-ground completion:				
Number of guard posts at well: 3				
Are the posts positioned to prevent collision damage to the well?	[X]	[ ]	[ ]	
Are any of the posts damaged or degraded?	[ ]	[X]	[ ]	
Is a concrete pad installed?	[X]	[ ]	[ ]	
Is the pad cracked or deteriorated?	[ ]	[X]	[ ]	
Is steel protective casing installed?	[X]	[ ]	[ ]	
Does the protective casing have a weep hole?	[X]	[ ]	[ ]	
Flush-mount completion:				
Is the traffic cover securely bolted to the flush-mount box?	[ ]	[ ]	[X]	
Does the well have a flush-mount box?	[ ]	[ ]	[X]	
Is the traffic cover cracked or broken?	[ ]	[ ]	[X]	
Is the concrete apron cracked or deteriorated?	[ ]	[ ]	[X]	
Identification:				
Is the well labeled with the correct number?	[X]	[ ]	[ ]	
Describe labeling: "86" STICKERS ON STEEL PROTECTIVE CASING				
Security:				
Does the well have a cap or lid?	[X]	[ ]	[ ]	
Does the well have a weatherproof lock?	[X]	[ ]	[ ]	
Does the lock secure the well?	[X]	[ ]	[ ]	
Does the inner casing have a cap?	[X]	[ ]	[ ]	
Down-hole Condition:				
Is the well casing bent, corroded, or broken (at the surface?)	[ ]	[X]	[ ]	
Is the well casing loose (at the surface?)	[ ]	[X]	[ ]	
Is a measurement point marked at the top of the well casing?	[X]	[ ]	[ ]	
Measured depth of the well from measurement point: 19.90				
Thickness of sediment accumulation (reported depth-present measurement): 0.01'				
Are there any obstructions in the well?	[ ]	[X]	[ ]	

Inspection Date: 10/15/18 Inspected by: Andrew Stiff

QA by: _____

APPENDIX B
2018 ANALYTICAL RESULTS, CHAIN-OF-CUSTODY FORMS, AND VALIDATION CHECKLISTS

(PROVIDED AS SEPARATE FOLDER ON THIS CD)

APPENDIX C
CORRECTIVE ACTION ORDER-LISTED TARGET ANALYTES, SCREENING CRITERIA, AND GROUNDWATER PROTECTION STANDARDS

TABLE G-3
Groundwater Protection Standards Including the Calculations for the Target Analytes Detected at AOC-GW Component Units
Holston Army Ammunition Plant (HSAAP), Kingsport, Tennessee

Source Area	Source Units	Chemical Compound Class	Detected Constituents (all units in µg/L)	Maximum Detected Concentration[1]	Tennessee General Water Quality Criteria[2]					Lowest Water Quality Criteria	Ground Water Protection Standard[3]	Point of Compliance (POC) Maximum Detected Concentration[4]
					Fish and Aquatic Life - Continuous	Recreational Uses - Water and Organism	Recreational Uses - Organism Only	Domestic Water Supply	RSL or MCL			
Area A	SWMU 96	SVOCs	Naphthalene	9.1	NV	NV	NV	0.14	RSL	0.14	238	0.12J
		VOCs	Benzene	11J	NV	22	510	5	MCL	5	8500	ND
			Methylene Chloride	7.8	NV	46	5900	5	MCL	5	8500	ND
Area B Landfill Area	SWMUs 19 and 29	RCRA Metals	Arsenic	12	150	10	10	10	MCL	10	17000	27.9
			Lead	16.5	2.5	NV	NV	15	MCL	2.5	4250	84.6
		SVOCs	Bis(2-ethylhexyl)phthalate	2,200	NV	12	22	6	MCL	6	10200	7.4J
			Dibenzofuran	860J	NV	NV	NV	5.8	RSL	5.8	9860	ND
			Fluorene	1,200	NV	1100	5300	220	RSL	220	374000	ND
			2-Methylnaphthalene	3300J	NV	NV	NV	27	RSL	27	45900	ND
			Naphthalene	1100J	NV	NV	NV	0.14	RSL	0.14	238	ND
			N-Nitrosodiphenylamine	150	NV	33	60	10	RSL	10	17000	ND
	SWMU 20	Explosives	RDX	76	NV	NV	NV	0.61	RSL	0.61	1037	76
		RCRA Metals	Arsenic	53	150	10	10	10	MCL	10	17000	5.8
			Chromium, Total	213	11	NV	NV	100	MCL	11	18700	12.4
Area B Production and Shop Area	SWMU 18	RCRA Metals	Mercury (elemental)	3.87	0.77	0.05	0.051	2	MCL	0.05	85	NA
	SWMUs 77/78/86/87 and 88	Pesticides	Bromacil	330J	NV	NV	NV	70 LHA	CAS NO. 314-40-9 not on RSL table	70	119000	NA
			Chlordane (total)	0.235	0.0043	0.0080	0.0081	2	MCL	0.0043	7.31	NA
			Dieldrin	0.78	0.056	0.00052	0.00054	0.0015	RSL	0.00052	0.884	NA
	Production Area SWMUs and AOCs	Explosives	2,4-Dinitrotoluene	0.39	NV	1.1	34	0.2	RSL	0.2	340	ND
			2,6-Dinitrotoluene	12	NV	NV	NV	15	RSL	15	25500	ND
			2,4,6-Trinitrotoluene	11	NV	NV	NV	2.2	RSL	2.2	3740	ND
			2-Amino-4,6-Dintrotoluene	7.9	NV	NV	NV	30	RSL	30	51000	ND
			4-Amino-2,6-Dinitrotoluene	8.8	NV	NV	NV	30	RSL	30	51000	ND
			Nitroglycerin	19	NV	NV	NV	1.5	RSL	1.5	2550	ND
			RDX	2,200	NV	NV	NV	0.61	RSL	0.61	1037	0.87J

NOTES: **NV** - No value is established by the State of Tennessee. **ND** - not detected. **NA** – no boundary well present. **RDX** – Hexahydro-1,3,5-trinitro-1,3,5-triazine
RCRA – Resource Conservation Recovery Act **VOCs** – Volatile Organic Compounds **SVOCs** – Semi-Volatile Organic Compounds
All units in micrograms per liter (µg/L) which is equivalent to parts per billion (ppb).
[1]Maximum detected concentration from all known historical history of the included wells through the Fall 2006 LTM event recorded in the AOC-GW Corrective Measures Report.
[2]Tennessee General Water Quality Criteria, 1200-4-3, (May 2011). Where no value established by TN 1200-4-3, then US EPA Regional Screening Levels (RSLs) are used for that constituent in the domestic water supply column. RSL values are in italics where used. MCL values are used in lieu of RSL when available.
[3]Proposed Ground Water Protection Standard is the lowest criteria multiplied by the site-specific dilution factor of 17,000 multiplied by 10 percent.
[4]Maximum detected concentration from POC/boundary wells. Boundary wells define the point of compliance (POC).

APPENDIX D
2018 INSPECTIONS

D.1 LANDFILL INSPECTION FORMS (SPRING 2018)

D.2 LANDFILL INSPECTION FORMS (FALL 2018)

D.3 HOLSTON ARMY AMMUNITION PLANT LANDFILL CAP/COVER INSPECTION REPORT FORMS (EVENT 1)

D.4 HOLSTON ARMY AMMUNITION PLANT LANDFILL CAP/COVER INSPECTION REPORT FORMS (EVENT 2)

APPENDIX D.1
LANDFILL INSPECTION FORMS (SPRING 2018)

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 04/01/18	

SWMU 4 – Coal Tar Tanks behind Building 8

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is in good condition (accurate, legible, clear, and sturdy, etc.). Small pieces of coal tar are scattered along the surface of the SWMU along the northern and eastern perimeters of the SWMU. Coal tar remains encrusted on the southern brick wall of Building 8; this material has been present and known about for several years and does not require action at this time. Gravel cap within SWMU boundary along the north side of the SWMU adjacent to Building 8 still has some minor rutting but does not require action at this time. No signs of erosion or settlement. No signs of unauthorized activities. No fences or gates associated with this SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes __X___ No _____ If yes, describe extent and location:

Small pieces of coal tar on the surface of the SWMU require removal.

Coal tar encrusted on Building 8 has been known about and does not require removal.

Rutting adjacent to Building 8 is minor and does not require action at this time.

Inspected by: Hillary Oswald - Bay West	Date: 04/01/18 Time: 1340

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs are required at this time.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Approximately 1 pound of coal tar is removed from the surface of the northern and eastern perimeters of the SWMU. The collected coal tar ranges in size from 0.5 cm to 5 cm. The coal tar is picked up by hand (wearing nitrile gloves) and placed into a zip lock bag. The zip lock bag is ultimately placed in a 55-gallon drum located in Building 141 containing coal tar from this inspection and 2017 inspections. No additional repairs to the cap are required.

Repairs completed on: 04/01/18	
Repair Record completed by: Hillary Oswald - Bay West	Date: 04/01/18 Time: 1355

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 04/01/18	

SWMU 14 – Coal Tar Landfill 1

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

The sign is in good condition (clear of vegetation, accurate, sturdy and legible). Good thick vegetative cover; vegetation is approximately 6-12 inches tall with no areas bare of vegetation or stressed with the exception of the area where coal tar was removed in Fall 2017. The area of the clay cap which was repaired following coal tar removal in Fall 2017 remains bare and requires seeding. No signs of settlement or erosion. No signs of unauthorized activity. Fence and gate along the south perimeter of the SWMU as part of the installation boundary fence is in good condition and covered in thick vegetation. The partially buried metal pipes remain near the southwest edge of the SWMU; these pipes have been known about for several years and do not require removal. Trees are present just behind the SWMU sign; one 4-inch diameter tree branching into two trunks and one trunk branching into 5+ trunks 3 inches in diameter. Small pieces of coal tar are observed scattered on the surface of the SWMU in an area directly adjacent to where the large, buried mass of coal tar was observed along the western edge of the SWMU in Fall 2017. A few larger pieces of coal tar are observed on the surface of the SWMU along the sloped area near the western edge of the SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No __X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes __X____ No _____ If yes, describe extent and location:

Coal tar requires removal.

Ms. Peters is informed of the trees directly behind the SWMU sign; they do not require action at this time.

The buried metal pipes have been known about for several years and do not require action.

The area bare of vegetation requires seeding.

Inspected by: Hillary Oswald - Bay West	Date: 04/01/18 Time: 1435

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

The area where new clay cap was placed in Fall 2017 has not grown grass. Clay cap material was brought on-site to fill in the hole made from removing a large buried mass of coal tar along the western edge of the SWMU in Fall 2017. The cap has not been restored; a tall fescue grass seed mix is spread over the bare area.

Repairs completed on: 04/06/18

Repair Record completed by:	Date: 04/06/18
Hillary Oswald - Bay West	Time: 1110

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Approximately 1 pound of coal tar and clay is removed from the surface of the SWMU from along the top of the SWMU within the western portion of the SWMU and also from along the western sloped area of the SWMU. The collected coal tar ranges in size from 1 cm to 5 cm. The coal tar is picked up by hand (wearing nitrile gloves) and placed into a zip lock bag. The zip lock bag is ultimately placed in a 55-gallon drum located in Building 141 containing coal tar from this inspection and 2017 inspections. No additional repairs to the cap are required.

Repairs completed on: 04/01/18

Repair Record completed by:	Date: 04/01/18
Hillary Oswald - Bay West	Time: 1500

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 03/26/18	

SWMU 18 – Closed Sanitary Landfill

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

The sign is in good condition (clear of vegetation, sturdy, accurate and legible). Good thick vegetative cover; vegetation is approximately 6 inches tall; no areas bare of vegetation or stressed. Some localized settlement is observed near the center of the SWMU, as well as areas near the western portion of the SWMU and within the eastern-central portions of the SWMU. Surface water ponding is observed within the low spots. No evidence of erosion or unauthorized activities/excavation. Debris (concrete) is observed along the western edges of the SWMU. Area around fill material for the telephone poles has good vegetation cover; some areas are bare of vegetation (exposed soil) and erosion along the southern slope is evident; this has been noted in previous inspections and is not part of the landfill cover. No fences or gates associated with this SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X___ If yes, describe extent and location:

Low spot/settlement areas will be repaired sometime in 2018.

Inspected by:	Hillary Oswald - Bay West Crystal Hann - Leidos	Date: 03/26/18 Time: 1540

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required at this time.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 03/26/18	

SWMUs 19/29 – Construction Debris Landfill and Former Sedimentation Pond

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is in good condition (clear of vegetation, stable, accurate and legible). No signs of settlement or erosion. Good thick vegetative cover; grass is approximately 6-12 inches tall. No areas bare of vegetation or stressed areas are observed. No fences or gates associated with this SWMU. No signs of erosion, settlement or unauthorized activities/excavation. The preferential drainage pathway repaired in 2013 and noted as beginning to reappear in the Spring 2015 inspection is evident but good vegetation cover is observed over the preferential drainage pathway area. No small, moveable pieces of asphalt are observed on the surface of the SWMU. Large, partially buried and unmovable pieces of asphalt as noted in previous inspections remain in the northeast corner of the SWMU, as well as along the eastern side of the SWMU (near the free-flowing drainage culvert) and along the west-central portion of the SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ____X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No __X___ If yes, describe extent and location:

During the Spring 2014 inspection, Bay West was given verbal confirmation that the larger, partially buried pieces of asphalt and other construction debris could remain in place.

The preferential drainage pathway does not require any repairs at this time but will continue to be monitored for erosion and stability in future inspections.

Inspected by:	Hillary Oswald - Bay West Crystal Hann - Leidos	Date: 03/26/18 Time: 1625

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 03/26/18	

SWMU 20 – Rock Quarry Landfill

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

The entire surface of the SWMU continues to have good vegetation cover (approximately 6 inches tall); no bare or stressed areas are observed. No surface water ponding is observed; area restored near MW-68/MW-68B in 2014 continues to remain in good condition. No evidence of settlement, erosion or unauthorized activities are observed. The two areas where construction debris was covered with clay cap in 2015 remain in good condition. The two areas have good vegetative cover and no surface water ponding is observed in these areas. In addition, the man-made ditch/drainage pathway at the base of the covered slope also does not contain any water at the time of the inspection. Bricks and an orange terracotta pipe are observed on the eastern slope of the quarry wall throughout the areas where additional construction debris has been located and has been noted in previous inspections. Sign is in good condition (clear of vegetation, sturdy, accurate and legible). No sinkholes or evidence of previous sinkholes are visible. No fences or gates associated with this SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X____ If yes, describe extent and location:

Ms. Peters is informed of the debris (bricks and orange terracotta pipe) along the eastern quarry wall; it has been present for years.

Inspected by:	Hillary Oswald - Bay West Crystal Hann - Leidos	Date: 03/26/18 Time: 1645

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 03/26/18	

SWMU 26 – WWII Coal Tar Site

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Good thick vegetative cover; vegetation in northern section of SWMU is 1-2 feet tall. Vegetation in southern, larger field is 6-12 tall; no areas bare of vegetation or stressed areas are observed. The area east of the access road which was restored in Spring 2017 appears to be in good condition; vegetation is growing, and no bare areas are visible. Sign is in good condition (legible, clear of vegetation, accurate and stable) although it remains slightly bent. No evidence (visual or olfactory) of coal tar at the surface of the SWMU. No fences or gates associated with this SWMU. No signs of settlement, erosion or unauthorized activities.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ____X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X____ If yes, describe extent and location:

Not applicable - no repairs required.

Inspected by: Hillary Oswald - Bay West Crystal Hann - Leidos	Date: 03/26/18 Time: 1420

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable - coal tar is not observed.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 03/26/18	

SWMUs 77/78/86/87 – Pesticide Sites at Building 148

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Signs are in good condition (legible, clear of vegetation, accurate and stable) with the exception of the SWMU sign near location H-87-1; one bolt has come loose and ripped the sign, so the sign is only connected by 3 bolts. This sign will be repaired during this Spring inspection event. Thick vegetation cover; vegetation is approximately 6 inches tall with no areas bare of vegetation or stressed. No signs of settlement, erosion or unauthorized activities. Storage containers adjacent to SWMU 87 (noted in previous inspections) remain overturned to prevent water accumulation. Standing surface water is observed in the area around abandoned monitoring well MW-72.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ____X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes __X____ No _____ If yes, describe extent and location:

The SWMU sign required repair.

Inspected by:	Hillary Oswald - Bay West Crystal Hann - Leidos	Date: 03/26/18 Time: 1455

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

The SWMU sign is repaired. New holes are drilled through the sign to bolt the sign to the existing stake. Two new bolts, washers and nuts are used to secure the sign to the existing stake. The sign is left in good repair.

Repairs completed on: 04/03/18	
Repair Record completed by: Hillary Oswald - Bay West	Date: 04/03/18 Time: 1400

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 03/26/18	

SWMU 88 – WWII Pesticide Site

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Good, thick vegetative cover; vegetation is approximately 6 inches tall with no bare or stressed areas observed. No materials or equipment stored on SWMU area. Sign is in good condition (clear of vegetation, accurate and legible, etc.). No evidence of settlement, erosion or unauthorized activities/excavation. No fences or gates associated with this SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No __X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X___ If yes, describe extent and location:

Not applicable - no repairs required.

Inspected by: Hillary Oswald - Bay West Crystal Hann - Leidos	Date: 03/26/18 Time: 1520

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 04/01/18	

SWMU 96 – Gas Producer Coal Tar Storage Tanks

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Signs are in good condition (sturdy, legible and accurate). The gravel cap does not appear disturbed (no rutting, settlement or signs of excavation/ unauthorized activities). A fence has been installed along the northern perimeter of the SWMU south of the railroad tracks; cannot access the northern-most SWMU sign without having access inside the new Eastman fence line. A significant amount of fragments of slag and coal are present on surface of the SWMU area and are concentrated along the northern portion of the SWMU within and around the railroad tracks; these have been present previously and are left in place. Coal tar remains visible and contained within the concrete containment west of the SWMU and encrusted on the north and east walls of the concrete containment. Coal tar is also observed encrusted on the railroad tracks and presumed to remain encrusted on the sewer grate north of the building adjacent to the east of the SWMU (within new fence line). Coal tar is also observed encrusted on a railroad tie just north of the northern SWMU sign. Small pieces of coal tar are observed along the surface of the SWMU along the northern, eastern and western perimeters. Minimal bricks are observed scattered along the surface of the SWMU; these have been previously noted and are left in place. One suspect ACM transite tile is observed near the central of the SWMU and is left in place. A large piece of sheet metal is observed on the northern perimeter of the SWMU. No surface water ponding is observed within the SWMU limits. No signs of settlement or erosion.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes __X____ No _____ If yes, describe extent and location:

Small pieces of coal tar require removal.

The coal tar observed within the containment west of the SWMU, within and around the railroad tracks and ties, as well as north of the building east of the SWMU do not require action at this time; all of this observed coal tar is outside of the SWMU area.

Ms. Peters is informed of the suspect ACM transite tile.

Sheet metal requires removal.

Inspected by: Hillary Oswald - Bay West	Date: 04/01/18 Time: 1405

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

The large piece of sheet metal is removed from the surface of the SWMU from the northern perimeter and secured within the adjacent building.

Repairs completed on: 04/01/18

Repair Record completed by:	Date: 04/01/18
Hillary Oswald – Bay West	Time: 1430

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Approximately 2 pounds of coal tar is removed from the surface of the SWMU along the northern, eastern and western perimeters of the SWMU, ranging in size from 1 cm to 10 cm. The coal tar is picked up by hand (wearing nitrile gloves) and placed in a zip lock bag. The zip lock bag is ultimately placed in a 55-gallon drum located in Building 141 containing coal tar from this inspection, as well as 2017 inspections. No additional repairs to the cap are required.

Repairs completed on: 04/01/18

Repair Record completed by:	Date: 04/01/18
Hillary Oswald - Bay West	Time: 1430

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 04/01/18	

SWMU 103 – Ditch behind Gas Producer Building

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is accurate, legible, sturdy and clear of vegetation. Perimeter installation fence is in good condition. No sign of settlement, erosion or unauthorized activities. Small pieces of coal tar are observed on the surface of the SWMU on the northern side of the fence within the extents of the SWMU. A large partially buried mass of coal tar is observed east of the SWMU sign just south of the installation fence line. Coal tar is presumed to remain underwater at the bank of the river where it is historically observed and known about by TDEC; TDEC is not requiring removal of this coal tar. The slope of the river bank is not inspected due to thick poison ivy and thick dead vegetation making the slope difficult to navigate.

LAND USE CONTROL INSPECTION Evidence of cap excavation or disturbance?
Yes _____ No __X_____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ___X____ No _____ If yes, describe extent and location:

Coal tar observed along the surface of the SWMU requires removal.

The coal tar along the river bank requires no action at this time.

Inspected by:	Hillary Oswald - Bay West Crystal Hann - Leidos	Date: 04/01/18 Time: 1510

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Approximately 80 pounds of coal tar is removed from the surface of the SWMU along the installation fence within the extents of the SWMU. Small pieces are observed scattered along the surface of the SWMU north of the fence line and a large, partially buried mass is observed just south of the installation fence line, east of the SWMU sign. The small pieces of collected coal tar ranges in size from 1 cm to 3 cm. The smaller pieces of coal tar are picked up by hand (wearing nitrile gloves) and placed in a zip lock bag. The large mass of coal tar is removed with a shovel. The mass of coal tar was approximately 4 feet in diameter and 2-3 inches thick. The large mass of coal tar is broken up into smaller pieces and placed into garbage bags. The zip lock bag and garbage bags are ultimately placed in a 55-gallon drum located in Building 141 containing coal tar from this inspection event, as well as 2017 inspections. No additional repairs to the cap are required following coal tar removal.

Repairs completed on: 04/01/18	
Repair Record completed by: Hillary Oswald - Bay West	Date: 04/01/18 Time: 1525

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 03/26/18	

SWMU 109 – WWII Coal Tar Site 2

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Signs are accurate, legible, sturdy and clear of vegetation. No sign of unauthorized activities or excavations. No fences or gates associated with this SWMU. Good, thick vegetative cover; vegetation is approximately 6 inches tall with no bare or stressed areas observed other than areas where coal tar is visible on the surface of the SWMU. One area of coal tar is observed on the surface of the SWMU within the western field. Coal tar is also visible on the surface of the SWMU within the cooling channel and north of the cooling channel towards the railroad embankment slope. TDEC is not requiring removal of this coal tar. No sign of settlement or erosion. There is water in both the cooling channel and the drainage ditch.

LAND USE CONTROL INSPECTION Evidence of cap excavation or disturbance?
Yes _____ No __X_____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X____ If yes, describe extent and location:

The coal tar on the surface of the SWMU and within the cooling channel requires no action at this time.

Inspected by:	Hillary Oswald - Bay West Crystal Hann - Leidos	Date: 03/26/18 Time: 1350

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 03/30/18	

SWMU 3 Buildings:	**H1, H2, H4, H5, H6, H7**	**M3, M4, M5, M6**
B3	**I5, I6**	**N6, N7, N8**
D2, D10	**J3**	**O3**
E1, E2, E5, E6, E7, E9, E10	**K3, K5**	
G4, G5, G6, G7, G9, G10	**L1, L3, L4, L5, L6, L8**	

INSPECTION FINDINGS: *Examine for:*

- *continuity of gravel cover (i.e., rutting, settlement, erosion, etc.) adjacent to building apron or general area of demolished building;*
- *presence and legibility of signs;*
- *signs of unauthorized excavation.*

All signs are in good condition (accurate, sturdy, legible, etc.) and depicted in correct locations on figure.

No signs of unauthorized activities/excavations. Gravel caps do not appear disturbed.

Gravel covers show no signs of settlement or erosion (either within area of noted contamination or entire apron/catch basin system surrounding building).

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X____ If yes, describe extent and location:

Inspected by: Hillary Oswald - Bay West Crystal Hann - Leidos	Date: 03/30/18 Time: 0830-1530

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 03/30/18	

SWMU 3 Buildings:	**H1, H2, H4, H5, H6, H7**	**M3, M4, M5, M6**
B3	**I5, I6**	**N6, N7, N8**
D2, D10	**J3**	**O3**
E1, E2, E5, E6, E7, E9, E10	**K3, K5**	
G4, G5, G6, G7, G9, G10	**L1, L3, L4, L5, L6, L8**	

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

NOT APPLICABLE

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 03/30/18	

SWMU 3 Buildings:	**G8**	**N4, N5**
D1, D5, D8	**H3, H8, H9, H10**	
E3, E4	**I3**	

INSPECTION FINDINGS: *Examine for:*

- *continuity of gravel cover (i.e., rutting, settlement, erosion, etc.) adjacent to building apron or general area of demolished building;*
- *presence and legibility of signs;*
- *signs of unauthorized excavation.*

For all buildings listed below the following apply: Signs are in good condition (accurate, sturdy, legible, etc.) and depicted in correct location on figure.

Building D1: What appears to be exposed soil was observed between the two sections of above-ground piping concrete containments north of the building. Another small patch of exposed soil was observed just south of the above-ground piping lines near the NE corner of the building apron. Minor erosion was observed below the southern-most above-ground piping containment. No other notable findings.

Building D5: Some erosion evident near NW corner apron, ~6 feet out from apron below concrete piping as well as near the SE corner apron also below concrete piping. Both appear to be natural erosion. This has been noted since the spring 2016 event; no appreciable changes have been noted since.

Building D8: Some historic settlement observed near NW corner of building, approximately 4 feet from road intersection and 3 feet from building apron. Settlement is circular with a 3-foot diameter and appears natural. This has been noted since the spring 2016 event; no appreciable changes have been noted since.

Building E3: There appears to be exposed soil around a new power pole near the W-NW apron. No other notable findings. This has been noted since the fall 2017 event; no appreciable changes have been noted since.

Building E4: Minor settlement is observed around a catch basin on the E side of the building and appears natural. This has been noted since the spring 2016 event; no appreciable changes have been noted since.

Building G8: Northern and western building aprons appear to have been disturbed due to building construction. The western apron appears to be new and has replaced the old one. A multitude of construction equipment is present around the building and work appears to be on-going. A sign is not present.

Buildings H3 (demolished building): Former building footprint is mostly covered with good, thick, dense vegetative cover. Vegetation is approximately 6 inches tall. An area of exposed/bare soil is observed just north of the catwalk south of the former building footprint (no vegetation or gravel cover) within an area with RDX detections above industrial and residential RSLs. No signs of unauthorized activities/ excavations.

Building H8 (demolished building): A large/linear area appears to have been disturbed or rutted. The area appears to have been restored and covered with straw.

Building H9 and H10 (demolished buildings): What appears to be areas within the footprints of the former buildings appear to have been disturbed/rutted. The areas have been restored and covered with straw. An area east of the former building footprint for Building H9 is a storage area for ongoing activities in the area: gravel is stockpiled adjacent to the former building footprint and other materials are stored nearby. Support columns for the new steam line have been installed adjacent to the road, which is located between the former building footprints and the road.

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 03/30/18	

SWMU 3 Buildings:	**G8**	**N4, N5**
D1, D5, D8	**H3, H8, H9, H10**	
E3, E4	**I3**	

Building I3: No sign is present associated with the building's catch basins/aprons. No signs of unauthorized activities/excavations. Gravel cover shows no signs of settlement or erosion (either within area of noted contamination or entire apron/catch basin system surrounding building).

Building N4: The western side of the building appears to have been disturbed; it appears as though new supports have been dug for the stairs leading to the building. Poly sheeting is observed below the stairs and around the western catch basins and aprons surrounding the building. HSAAP personnel indicated that no construction has taken place at the building.

Building N5: The SWMU 3 sign near the southern side of the building area is covered by a dumpster - unable to view sign. Minor erosion is observed around the northern catch basin (bare soil).

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ____X___ If yes, describe location and extent:

HSAAP environmental personnel confirmed that the work at G8 was authorized and all required notifications were conducted prior to initiating the work.

REPAIRS REQUIRED? Yes _____ No ___X____ If yes, describe extent and location:

Inspected by: Hillary Oswald - Bay West Crystal Hann - Leidos	Date: 03/30/18 Time: 0830-1530

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 03/30/18	

SWMU 3 Buildings:	**G7, G8**	**J3**
D1, D5, D8	**H1, H2, H3, H8, H9, H10**	**L1**
E3, E4, E7	**I3**	**N4, N6**

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

NOT APPLICABLE

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 03/30/18	

SWMU 3 Buildings:
N3

INSPECTION FINDINGS: *Examine for:*

- *continuity of gravel cover (i.e., rutting, settlement, erosion, etc.) adjacent to building apron or general area of demolished building;*
- *presence and legibility of signs;*
- *signs of unauthorized excavation.*

All signs are in good condition (accurate, sturdy, legible, etc.) and depicted in correct locations on figure.

No signs of unauthorized activities/excavations. Gravel caps do not appear disturbed.

Gravel covers show no signs of settlement or erosion (either within area of noted contamination or entire apron/catch basin system surrounding building).

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X____ If yes, describe extent and location:

Inspected by: Hillary Oswald - Bay West	Date: 04/04/18 Time: 0830

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 03/30/18	
SWMU 3 Buildings: **N3**	

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

NOT APPLICABLE

Repairs completed on:	
Repair Record completed by:	Date: Time:

APPENDIX D.2
LANDFILL INSPECTION FORMS (FALL 2018)

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/18/18	

SWMU 4 – Coal Tar Tanks behind Building 8

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is in good condition (accurate, legible, clear, and sturdy, etc.). Small pieces of coal tar are scattered along the surface of the SWMU along the northern and eastern perimeters of the SWMU. Coal tar remains encrusted on the southern brick wall of Building 8; this material has been present and known about for several years and does not require action at this time. Gravel cap within SWMU boundary along the north side of the SWMU adjacent to Building 8 still has some minor rutting but does not require action at this time. Vegetation is beginning to grow through the gravel cap within the northern extents of the SWMU. No signs of erosion or settlement. No signs of unauthorized activities. No fences or gates associated with this SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes __X___ No _____ If yes, describe extent and location:

Small pieces of coal tar on the surface of the SWMU require removal.

Coal tar encrusted on Building 8 has been known about and does not require removal.

Rutting adjacent to Building 8 is minor and does not require action at this time.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/18/18 Time: 1200

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs are required at this time.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Approximately 0.50 pounds of coal tar is removed from the surface of the northern and eastern perimeters of the SWMU. The collected coal tar ranges in size from 0.5 cm to 2 cm. The coal tar is picked up by hand (wearing nitrile gloves) and placed into a zip lock bag. The zip lock bag is ultimately placed in a 55-gallon drum located in Building 141 containing coal tar from inspections conducted throughout 2017 and 2018. No additional repairs to the cap are required.

Repairs completed on: 10/18/18	
Repair Record completed by: Hillary Oswald - Bay West	Date: 10/18/18 Time: 1210

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/18/18	

SWMU 14 – Coal Tar Landfill 1

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

The sign is in good condition (clear of vegetation, accurate, sturdy and legible). Good thick vegetative cover; vegetation is approximately 18-24 inches tall with no areas bare of vegetation or stressed.The northwestern portion of the SWMU and the area surrounding where coal tar was removed in 2017 is surrounding by 4-5 foot tall vegetation making this area very difficult to inspect for coal tar. The presence of coal tar (visual or olfactory) is not identified throughout the SWMU. No signs of settlement or erosion. No signs of unauthorized activity. Fence and gate along the south perimeter of the SWMU as part of the installation boundary fence is in good condition and covered in thick vegetation. The partially buried metal pipes remain near the southwest edge of the SWMU; these pipes have been known about for several years and do not require removal. The pipes are now marked with a reflecting pole, so the mowers can steer clear of this area. Trees are present just behind the SWMU sign; one 4-inch diameter tree branching into two trunks and one trunk branching into 5+ trunks 3 inches in diameter. Small trees are beginning to sprout near the fire hydrant near the north-northeast area of the SWMU; this vegetation will be monitored, and the sprouting vegetation will be removed in Spring 2019.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No __X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No __X___ If yes, describe extent and location:

Ms. Peters is informed of the trees directly behind the SWMU sign; they do not require action at this time. Sprouting vegetation within the SWMU will be monitored and cut down in Spring 2019.

The buried metal pipes have been known about for several years and do not require action.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/18/18 Time: 1110

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - No repairs are required at this time.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable - coal tar was not observed on the surface of the SWMU.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/18/18	

SWMU 18 – Closed Sanitary Landfill

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

The sign is in good condition (clear of vegetation, sturdy, accurate and legible). Good thick vegetative cover; vegetation is approximately 12-18 inches tall; no areas bare of vegetation or stressed. Some localized settlement is observed near the center of the SWMU, as well as areas near the western portion of the SWMU and within the eastern-central portions of the SWMU. Surface water ponding is not observed within the low spots at the time of this inspection event. No evidence of erosion or unauthorized activities/excavation. Debris (concrete) is observed along the western edges of the SWMU. Area around fill material for the telephone poles has good vegetation cover. Bare and eroding areas have been observed in this area in previous inspection events; this area is not part of the landfill cover. No fences or gates associated with this SWMU. The low spots/settlement areas are marked with pin flags at the time of this inspection event to assist in repair and restoration activities to be completed the week of October 22.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ___X___ No _____ If yes, describe extent and location:

Low spot/settlement areas will be repaired during the week of October 22.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/18/18 Time: 0830

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Approximately 56 cubic yards (cy) of clay fill material is transported to the site from the Barrow Pit utilizing a dump truck and a compact track loader. The clay fill is then compacted into the low spots/settlement areas observed in 2017 and Spring 2018, utilizing the compact track loader. Approximately 13 separate low spots are observed and filled in with the clay fill. Following clay fill compaction, approximately 14 cy of topsoil is spread on top of the clay fill throughout the settlement areas. Following topsoil placement, a fescue seed blend and Rye grass seed blend are spread throughout the settlement areas. Following seeding, straw is spread over the seeded areas.

Repairs completed on: 10/22/18	
Repair Record completed by: Hillary Oswald - Bay West	Date: 10/22/18 Time: 1715

COAL TAR REMOVAL:

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/18/18	

SWMUs 19/29 – Construction Debris Landfill and Former Sedimentation Pond

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is in good condition (clear of vegetation, stable, accurate and legible). No signs of settlement or erosion. Good thick vegetative cover; grass is approximately 2-3 feet tall. No areas bare of vegetation or stressed areas are observed. No fences or gates associated with this SWMU. No signs of erosion or unauthorized activities/excavation. Several minor depressions are observed within the center of the SWMU near the area where the preferential drainage pathway had been previously restored. No standing surface water is observed within these depressions. The preferential drainage pathway repaired in 2013 and noted as beginning to reappear in the Spring 2015 inspection is not evident at this time; good vegetation cover is observed over the preferential drainage pathway area. No small, moveable pieces of asphalt are observed on the surface of the SWMU. Large, partially buried and unmovable pieces of asphalt as noted in previous inspections remain in the northeast corner of the SWMU, as well as along the eastern side of the SWMU (near the free-flowing drainage culvert) and along the west-central portion of the SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ____X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No __X___ If yes, describe extent and location:

During the Spring 2014 inspection, Bay West was given verbal confirmation that the larger, partially buried pieces of asphalt and other construction debris could remain in place.

The preferential drainage pathway does not require any repairs at this time and will continue to be monitored for erosion and stability in future inspections.

The minor depressions observed within the center of the SWMU will be monitored for further settlement and surface water accumulation.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/18/18 Time: 1000

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required at this time.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/18/18	

SWMU 20 – Rock Quarry Landfill

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

The entire surface of the SWMU continues to have good vegetation cover (approximately 12-24 inches tall); no bare or stressed areas are observed. No surface water ponding is observed; area restored near MW-68/MW-68B in 2014 continues to remain in good condition. No evidence of settlement, erosion or unauthorized activities are observed. The two areas where construction debris was covered with clay cap in 2015 remain in good condition. The two areas have good vegetative cover and no surface water ponding is observed in these areas. In addition, the man-made ditch/drainage pathway at the base of the covered slope also does not contain any water at the time of the inspection. Bricks and an orange terracotta pipe are observed on the eastern slope of the quarry wall throughout the areas where additional construction debris has been located and has been noted in previous inspections. New construction debris is observed along the eastern quarry face: tar paper, metal, glass, brick, terracotta piping, and ceramic tiles. It is likely that more debris is present beneath this newly observed debris. Sign is in good condition (clear of vegetation, sturdy, accurate and legible). No sinkholes or evidence of previous sinkholes are visible. No fences or gates associated with this SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X___ If yes, describe extent and location:

Ms. Peters is aware of the debris noted in this and previous inspections (bricks and orange terracotta pipe) along the eastern quarry wall; it has been present for years.

Ms. Peters is informed of the new debris noted in this inspection (tar paper, metal, glass, brick, terracotta piping, and ceramic tiles) along the eastern quarry wall.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/18/18 Time: 0935

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required at this time.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/15/18	

SWMU 26 – WWII Coal Tar Site

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Good thick vegetative cover; vegetation is 1-3 feet tall. No areas bare of vegetation or stressed areas are observed. The area east of the access road which was restored in Spring 2017 is in great condition; vegetation is 1-2 feet tall and no bare areas are visible. Sign is in good condition (legible, clear of vegetation, accurate and stable) although it remains slightly bent. No evidence (visual or olfactory) of coal tar at the surface of the SWMU. No fences or gates associated with this SWMU. No signs of settlement, erosion or unauthorized activities.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ____X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X____ If yes, describe extent and location:

Not applicable - no repairs required.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/15/18 Time: 1340

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable - coal tar is not observed.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/15/18	

SWMUs 77/78/86/87 – Pesticide Sites at Building 148

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Signs are in good condition (legible, clear of vegetation, accurate and stable). Thick vegetation cover; vegetation is approximately 2-3 feet tall. The area surrounding MW-73 is bare of vegetation. No signs of settlement, erosion or unauthorized activities. Storage containers adjacent to SWMU 87 (noted in previous inspections) remain overturned to prevent water accumulation. Standing surface water is not observed within the extents of the SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ____X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No __X___ If yes, describe extent and location:

Not applicable - no repairs required at this time.

Inspected by:	Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/15/18 Time: 1630

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required at this time.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/15/18	

SWMU 88 – WWII Pesticide Site

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Good, thick vegetative cover; vegetation is approximately 4-5 feet tall with no bare or stressed areas observed. No materials or equipment stored on SWMU area. Sign is in good condition (clear of vegetation, accurate and legible, etc.). No evidence of settlement, erosion or unauthorized activities/excavation. No fences or gates associated with this SWMU.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No __X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X___ If yes, describe extent and location:

Not applicable - no repairs required.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/15/18 Time: 1655

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/18/18	

SWMU 96 – Gas Producer Coal Tar Storage Tanks

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Signs are in good condition (sturdy, legible and accurate). The gravel cap does not appear disturbed (no rutting, settlement or signs of excavation/unauthorized activities). A fence has been installed along the northern perimeter of the SWMU south of the railroad tracks; cannot access the northern-most SWMU sign without having access inside the new Eastman fence line. Significant amounts of fragments of slag and coal are present on surface of the SWMU area and are concentrated along the northern portion of the SWMU within and around the railroad tracks; these have been present previously and are left in place. Coal tar remains visible and contained within the concrete containment west of the SWMU and encrusted on the north and east walls of the concrete containment. Coal tar is also observed encrusted on the railroad tracks and presumed to remain encrusted on the sewer grate north of the building adjacent to the east of the SWMU (within new fence line). Coal tar is also observed encrusted on a railroad tie just north of the northern SWMU sign. Small pieces of coal tar are observed along the surface of the SWMU along the northern and western perimeters. Minimal bricks are observed scattered along the surface of the SWMU; these have been previously noted and are left in place. Suspect ACM transite tiles is observed near the central of the SWMU and are left in place. Surface water ponding is observed within the east-southeastern portion of the SWMU. No signs of settlement or erosion.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes __X____ No _____ If yes, describe extent and location:

Small pieces of coal tar require removal.

The coal tar observed within the containment west of the SWMU, within and around the railroad tracks and ties, as well as north of the building east of the SWMU do not require action at this time; all of this observed coal tar is outside of the SWMU area.

Ms. Peters is informed of the suspect ACM transite tile.

Inspected by:	Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/18/18 Time: 1145

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Approximately 0.25 pounds of coal tar is removed from the surface of the SWMU along the northern and western perimeters of the SWMU, ranging in size from 0.5 to 1 cm. The coal tar is picked up by hand (wearing nitrile gloves) and placed in a zip lock bag. The zip lock bag is ultimately placed in a 55-gallon drum located in Building 141 containing coal tar from 2017 and 2018 inspections. No additional repairs to the cap are required.

Repairs completed on: 10/18/18	
Repair Record completed by: Hillary Oswald - Bay West	Date: 10/18/18 Time: 1155

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/18/18	

SWMU 103 – Ditch behind Gas Producer Building

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Sign is accurate, legible, sturdy and clear of vegetation. Perimeter installation fence is in good condition. No sign of settlement, erosion or unauthorized activities. Coal tar (visual or olfactory) is not observed on the surface of the SWMU. Coal tar is presumed to remain underwater at the bank of the river where it is historically observed and known about by TDEC; TDEC is not requiring removal of this coal tar. The slope of the river bank is not inspected due to thick poison ivy and thick dead vegetation making the slope difficult to navigate.

LAND USE CONTROL INSPECTION Evidence of cap excavation or disturbance?
Yes _____ No __X_____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X___ If yes, describe extent and location:

The coal tar along the river bank requires no action at this time.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/18/18 Time: 1220

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable - coal tar is not observed on the surface of the SWMU.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07
Date: 10/15/18	

SWMU 109 – WWII Coal Tar Site 2

INSPECTION FINDINGS:

Examine for coal tar seepage [SWMUs 4, 14, 26, 96, 103 only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Signs are accurate, legible, sturdy and clear of vegetation. No sign of unauthorized activities or excavations. No fences or gates associated with this SWMU. Good, thick vegetative cover; vegetation is approximately 1-2 feet tall with no bare or stressed areas observed. Coal tar (visual or olfactory) is not observed on the surface of the SWMU at this time due to thick vegetation cover; coal tar is presumed to remain in areas where it has previously been observed and documented on the surface of the SWMU. Coal tar is also visible on the surface of the SWMU within the cooling channel and north of the cooling channel towards the railroad embankment slope. TDEC is not requiring removal of this coal tar. No signs of settlement or erosion. There is water in both the cooling channel and the drainage ditch.

LAND USE CONTROL INSPECTION Evidence of cap excavation or disturbance?
Yes _____ No __X_____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X____ If yes, describe extent and location:

The coal tar on the surface of the SWMU and within the cooling channel requires no action at this time.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/15/18 Time: 1410

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #J160167	Task: 07

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 10/18/18, 10/19/18 & 10/23/18	

SWMU 3 Buildings:	**H1, H2, H4, H5, H6, H7**	**L3, L4, L5, L6**
D2	**I5, I6**	**M3, M4, M5, M6**
E1, E2, E5, E6, E7, E9	**J3**	**N3, N6, N7, N8**
G4, G5, G6, G7, G9, G10	**K3, K5**	**O3**

INSPECTION FINDINGS: *Examine for:*

- *continuity of gravel cover (i.e., rutting, settlement, erosion, etc.) adjacent to building apron or general area of demolished building;*
- *presence and legibility of signs;*
- *signs of unauthorized excavation.*

All signs are in good condition (accurate, sturdy, legible, etc.) and depicted in correct locations on figure.

No signs of unauthorized activities/excavations. Gravel or vegetative caps do not appear disturbed.

Gravel and vegetative covers show no signs of settlement or erosion (either within area of noted contamination or entire apron/catch basin system surrounding building).

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ___X____ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X____ If yes, describe extent and location:

Not applicable - no repairs required at this time.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/18/18 - 10/19/18 - 10/23/18 Time: 1305-1530 - 0835-1015 - 0925-0955

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 10/18/18, 10/19/18 & 10/23/18	

SWMU 3 Buildings:	**H1, H2, H4, H5, H6, H7**	**L3, L4, L5, L6**
D2	**I5, I6**	**M3, M4, M5, M6**
E1, E2, E5, E6, E7, E9	**J3**	**N3, N6, N7, N8**
G4, G5, G6, G7, G9, G10	**K3, K5**	**O3**

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 10/18/18, 10/19/18 & 10/23/18	

SWMU 3 Buildings:	**E3, E4, E10**	**I3**
B3	**G8**	**L1, L8**
D1, D5, D8, D10	**H3, H8, H9, H10**	**N4, N5**

INSPECTION FINDINGS: *Examine for:*

- *continuity of gravel cover (i.e., rutting, settlement, erosion, etc.) adjacent to building apron or general area of demolished building;*
- *presence and legibility of signs;*
- *signs of unauthorized excavation.*

For all buildings listed below the following apply: Signs are in good condition (accurate, sturdy, legible, etc.) and depicted in correct location on figure.

Building B3: SWMU sign is damaged; the top left bolt has come loose and is no longer securing the sign and requires repair. This sign will be repaired in Spring 2019. No other notable findings.

Building D1: Exposed soil was observed between the two sections of above-ground piping concrete containments north of the building. Another small patch of exposed soil was observed just south of the above-ground piping lines near the NE corner of the building apron. Minor erosion was observed below the southern-most above-ground piping containment. No other notable findings.

Building D5: Some erosion evident near NW corner apron, ~6 feet out from apron below concrete piping as well as near the SE corner apron also below concrete piping. Both appear to be natural erosion. This has been noted since the spring 2016 event; no appreciable changes have been noted since.

Building D8: Some historic settlement observed near NW corner of building, approximately 4 feet from road intersection and 3 feet from building apron. Settlement is circular with a 3-foot diameter and appears natural. This has been noted since the spring 2016 event; no appreciable changes have been noted since.

Building D10: A new concrete pad with a grate cover appears to have been installed south of the southeastern catch basin; the concrete appears to be a different color than surrounding concrete and new gravel appears to be present surrounding the concrete pad. No exposed soil is visible surrounding the catch basins/aprons. No other notable findings.

Building E3: Minimal gravel cover/exposed soil is observed around a power pole near the W-NW apron. No other notable findings. This has been noted since the fall 2017 event; no appreciable changes have been noted since.

Building E4: Minor settlement is observed around a catch basin on the E side of the building and appears natural. This has been noted since the spring 2016 event; no appreciable changes have been noted since.

Building E10: New concrete support columns for the steam line have been installed along the southern side of the building.

Building G8: Construction surrounding this building appears to be complete - no signs of new disturbance. A SWMU sign is not present near this building.

Buildings H3 (demolished building): Former building footprint is mostly covered with good, thick, dense vegetative cover. Vegetation is approximately 4 feet tall. An area of exposed/bare soil is observed just north of the catwalk south of the former building footprint (no vegetation or gravel cover) within an area with RDX detections above industrial and residential RSLs. No signs of unauthorized activities/ excavations.

Building H8 (demolished building): The area south of the installed SWMU 3 sign is bare of vegetation. It appears to have originated from the installation of the concrete pillars for the new steam lines although no

steam lines are present within this area. The SWMU sign appears to have been struck; the sign is loose and one side of the sign is slightly elevated than the other.

Building H9 and H10 (demolished buildings): Areas within the footprints of the former buildings are bare of vegetation. Support columns for the new steam line have been installed adjacent to the road, which is located between the former building footprints and the road.

Building I3: No sign is present associated with the building's catch basins/aprons. No signs of unauthorized activities/excavations. Gravel cover shows no signs of settlement or erosion (either within area of noted contamination or entire apron/catch basin system surrounding building).

Building L1: A utility shut-off valve near the western side of the building has bare soil exposed surrounding it; appears to have been disturbed.

Building L8: Ms. Peters informed Bay West personnel of explosives on the ground near the scrubber; she advised that personnel not walk around the building during the inspection. The inspection is completed from the road; there appears to be fresh gravel along the eastern side of the building. No obvious signs of disturbance are visible.

Building N4: This building is unable to be accessed during the times of the inspections. The building is barricaded off, restricting access during the entirety of the inspection times.

Building N5: The SWMU 3 sign near the southern side of the building area is partially covered by a dumpster.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes _____ No ____X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes _____ No ___X____ If yes, describe extent and location:

Not applicable.

Inspected by: Hillary Oswald - Bay West Andy Steffe - Leidos	Date: 10/18/18 - 10/19/18 - 10/23/18 Time: 1305-1530 - 0835-1015 - 0925-0955

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job #160167	Task:07
Date: 03/30/18	

SWMU 3 Buildings:	**G7, G8**	**J3**
D1, D5, D8	**H1, H2, H3, H8, H9, H10**	**L1**
E3, E4, E7	**I3**	**N4, N6**

REPAIR RECORD:
(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Not applicable - no repairs required.

Repairs completed on:	
Repair Record completed by:	Date: Time:

COAL TAR REMOVAL:
(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not applicable.

Repairs completed on:	
Repair Record completed by:	Date: Time:

APPENDIX D.3
HOLSTON ARMY AMMUNITION PLANT LANDFILL CAP/COVER INSPECTION REPORT FORMS (EVENT 1)

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 3/29/2018	
Site: AOC N – Hydraulic Fluid Leak, Elevator at Building G-2	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

No sign of digging or erosion.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 3/29/2018 Time: 1540 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/25/2018	
Site: SWMU 21 – Rock Dam Landfill	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Vegetation is well established over the entire site.

Sign is legible, but it is the original closure sign.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 5/25/2018 Time: 1315 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

None identified

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 03/28/2018	
Site: SWMU 23 – Fly Ash Landfill	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Vegetation is well established over the entire site.

A new sign has been installed that matches other LUC signs.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 03/28/2018 Time: 1000 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

None identified

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/24/2018	
Site: SWMU 24 – Building 200 Coal Tar and Fly Ash Landfill	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Walked additional area to look for coal tar and found one additional small area near 2nd telephone pole. This will be included with the main coal tar removal near MW77, which was still present at this inspection.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X__ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 5/24/2018 Time: 14:55 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on:	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/25/2018	
Site: SWMU 25 – Area B Tar Burial Site	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Vegetation is well established over the entire site.
Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 5/25/2018 Time: 1345 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

None identified

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/24/2018	
Site: SWMU 27 – Sedimentation Pond for Coal Pile	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Good vegetation around pond.
No sign of unauthorized use.
Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No _X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 5/24/2018 Time: 1445 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/24/2018	
Site: SWMU 37 – Nitric Acid Spill Pond	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Heavy vegetation on fence and around ponds.
No unauthorized use observed.
Sign is legible

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X__ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 5/24/2018 Time: 1420hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/7/2018	
Site: SWMU 44 – Former Burning Pads	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

No excavation or site disturbance noted.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No __X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X__ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 5/7/2018 Time: 1325 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/7/2018	
Site: SWMU 47 – Burning Piles	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

No excavation or site disturbance noted.

Sign at main fence is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No __X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No ___X__ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 5/7/2018 Time: 1325 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 5/24/2018	
Site: SWMU 56 – Existing Coal Pile	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Erosion paths in coal are minimal and being maintained.
Sign is legible, but leaning.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No _X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 5/24/2018 Time: 1445 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: TBD	
Repair Record completed by: TBD	Date: TBD

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

APPENDIX D.4
HOLSTON ARMY AMMUNITION PLANT LANDFILL CAP/COVER INSPECTION REPORT FORMS (EVENT 2)

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/12/2018	
Site: AOC N – Hydraulic Fluid Leak, Elevator at Building G-2	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

No sign of digging or erosion.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 10/12/2018 Time: 1500 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/12/2018	
Site: SWMU 21 – Rock Dam Landfill	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Vegetation is well established over the entire site.

Sign is legible, but it is the original closure sign.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 10/12/2018 Time: 1345 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

None identified

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/12/2018	
Site: SWMU 23 – Fly Ash Landfill	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Vegetation is well established over the entire site.

Sign is in good condition.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 10/12/2018 Time: 1440 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

None identified

Repairs completed on: N/A

Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 01/22/2019	
Site: SWMU 24 – Building 200 Coal Tar and Fly Ash Landfill	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Coal tar has been removed from the surface. Reseeded area looks good. No other areas identified during inspection

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X__ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 01/22/2019 Time: 13:25 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on:	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/12/2018	
Site: SWMU 25 – Area B Tar Burial Site	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Vegetation is well established over the entire site.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 10/12/2018 Time: 1410 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA

Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

None identified

Repairs completed on: N/A

Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 01/22/2019	
Site: SWMU 27 – Sedimentation Pond for Coal Pile	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Good vegetation around pond.
No sign of unauthorized use.
Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No _X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 01/22/2019 Time: 1525 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/12/2018	
Site: SWMU 37 – Nitric Acid Spill Pond	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Heavy vegetation on fence and around ponds.
No unauthorized use observed.
Sign is legible

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X__ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 10/12/2018 Time: 1450hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/12/2018	
Site: SWMU 44 – Former Burning Pads	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

No excavation or site disturbance noted.

Sign is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No __X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No __X__ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 10/12/2018 Time: 1445 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 10/12/2018	
Site: SWMU 47 – Burning Piles	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

No excavation or site disturbance noted.

Sign at main fence is legible.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?

Yes ____ No __X___ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No ___X__ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 10/12/2018 Time: 1450 hours

LANDFILL CAP/COVER INSPECTION REPORT	
SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: NA	
Repair Record completed by: NA	Date: NA

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A	
Repair Record completed by: N/A	Date: N/A

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A
Date: 01/22/2019	
Site: SWMU 56 – Existing Coal Pile	

INSPECTION FINDINGS:

Examine for coal tar seepage [coal tar sites only]; settlement, erosion, damage; integrity of cover, drainage controls, gates, fences; presence and legibility of signs/postings, etc.

Erosion paths in coal are few, but the few there are large. Operator stated that the erosion paths are more stable when left to create the preferred pathway..
Sign is legible, but leaning.

LAND USE CONTROL INSPECTION: Evidence of cap excavation or disturbance?
Yes ____ No ___X__ If yes, describe location and extent:

REPAIRS REQUIRED? Yes ____ No _X___ If yes, describe extent and location:

Inspected by: Laura Peters	Date: 01/22/2019 Time: 1525 hours

LANDFILL CAP/COVER INSPECTION REPORT

SWMU/AOC: LTM/LTO – Landfill Inspections	Field Activity: Landfill Cap/Cover Inspection
Job # N/A	Task: N/A

REPAIR RECORD

(Provide description of repairs made, including equipment & materials used to complete repairs, etc.)

Repairs completed on: TBD

Repair Record completed by: TBD	Date: TBD

COAL TAR REMOVAL

(Include quantity removed, repairs made to cap, disposition of coal tar, etc.)

Not Applicable.

Repairs completed on: N/A

Repair Record completed by: N/A	Date: N/A